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ABSTRACT

Having steadily raised primary enrollment rates over the past 4 decades, India now has 67 million children aged 6-10 who are attending primary school, but 28-32 million who are not. This book draws on a wide range of sources, including original analytical work by Indian researchers and others, to describe the current state of primary education in India, identify key challenges, and recommend directions for reform. Chapters: (1) provide an overview of Indian primary education; (2) explain the economic and social benefits that justify investment in primary education; (3) examine low attendance rates and widespread grade repetition in certain regions, the need to increase the supply of classrooms and teachers, possible incentives to increase school attendance, and the cost benefits of improved student flow; (4) discuss low student achievement in low-literacy rural areas, achievement gaps by gender and social class, and strategies for improving achievement; (5) explore the effects of poverty on enrollment, persistence, and achievement, as well as strategies for reducing gender, caste, and ethnic gaps in these indicators; (6) describe teacher characteristics and weaknesses, teaching conditions, and strategies for improving teacher performance; (7) examine means for improving textbook quality and the efficiency of their production; (8) discuss recent decentralization of educational governance and strategies for building managerial and institutional capacity; (9) describe educational finance at the federal and state levels; and (10) recommend financial strategies. Appendices summarize studies of school incentive programs and unit costs of elementary education and provide tables of basic education indicators for the 15 major states. Includes notes, an extensive bibliography, and many tables and figures. (SV)

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Primary Education in India

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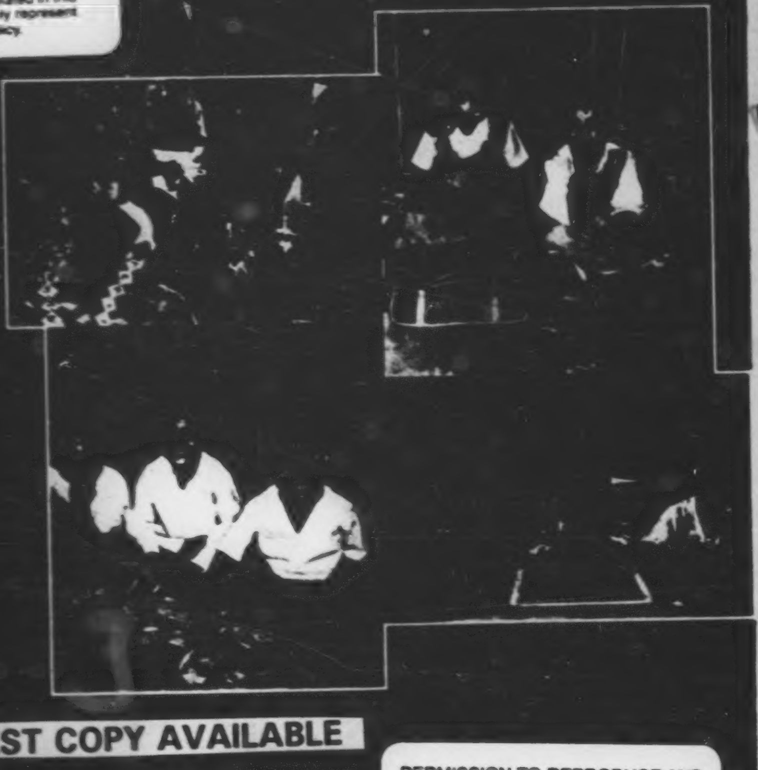

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DEVELOPMENT
IN PRACTICE

Primary Education in India

3

Primary Education in India

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Preface

This report was written by a team led by Marlaine Lockheed (principal education specialist and task manager) and comprising John Middleton (chief, New Products and Outreach, Economic Development Institute), Keith Hinchliffe (senior economist), N. K. Jangira (education specialist), Philip Cohen (consultant), Jane Hannaway (The Urban Institute, Washington), and Adriaan Verspoor (education adviser). It is based on a collaborative program of research and studies conceptualized and carried out in India by the Ministry of Human Resource Development/Department of Education and major Indian research institutions and scholars. The report was prepared under the overall direction of Richard Skolnik (chief, Population and Human Resources Operation Division) and Heinz Vergin (director, South Asia Country Department 2—Bhutan, India, and Nepal); special guidance was given by John Middleton and Adriaan Verspoor from the World Bank's Resident Mission in New Delhi. Comments on the text were received from peer reviewers Robert Hecht (principal economist), Emmanuel Jimenez (chief, Poverty and Human Resources Division, Policy and Research Department), and Erik Hanushek (University of Rochester). J. Douglas Willms (University of New Brunswick) advised on hierarchical linear modeling. Statistical and computational assistance was provided by Bing Deng (consultant) and Alaka Singh (consultant). Population estimates were computed by Laura Shrestha (demographer). Meera Chatterjee (women-in-development officer) contributed an analysis of tribal demographics. Bruce Ross-Larson, Allison Strong, and Elizabeth Forsyth edited this book. Paola Brezny was the proofreader. Production assistance was provided by Margot Verbeeck and Phil Alipio.

The team wishes to express its thanks for the encouragement and extensive collaboration of India's Ministry of Human Resource Development/Department of Education and the District Primary Education Program (DPEP) Bureau and Technical Support Group, and in particular to S. V. Giri, former secretary; P. R. Dasgupta, secretary; R. V. V. Ayyar, additional secretary; and R. S. Pandey, joint secretary. The team also gratefully acknowledges its debt to the institutions and the many scholars whose work made the preparation of this report possible, in particular the National Council of Educational Research and Training, the National Institute of Educational Planning and Administration, the Central Institute of Indian Languages, the School of Planning and Architecture, the National Institute of Rural Development, the Institute of Social and Economic Change, the New Concept Consultancy Services, and the various researchers whose background papers are listed in the bibliography. The assistance of UNICEF in making available DPEP baseline data for the states of Orissa and Madhya Pradesh and of the Overseas Development Administration of the United Kingdom for unpublished data on Andhra Pradesh is gratefully acknowledged. Support for several project preparation studies cited in this book was provided through a grant by the Japanese government to the government of India.

This book is the product of the World Bank. However, it has been enriched through discussions and meetings in which high-level Indian officials and experts participated. Key findings were presented in a seminar at the Ministry of Human Resource Development on August 1, 1996. The World Bank's Board of Executive Directors discussed the report in September 1996.

The book draws heavily on research carried out under the auspices of the Department of Education/DPEP Bureau and largely addresses issues related to the education of disadvantaged groups and areas. Research and studies carried out for the District Primary Education Program have significantly increased the base of knowledge about primary education in India. To the extent possible, the book synthesizes this empirical evidence. Still, many topics such as early childhood education are not covered. The deficiencies of this book may encourage others to pay more attention to research on primary education.

Although various alternative suggestions are given for solving the challenges of primary education in India, the book is not intended to be prescriptive. Indeed, it could not be, given India's size and diversity.

Summary

India's primary education glass is two-thirds full, one-third empty. Having steadily raised primary enrollment rates over the past four decades, India now has 67 million children ages 6–10 who are attending primary school, but 28 million to 32 million primary-school-age children who are not.

The result is that many of the huge returns to primary education are forgone. Primary education leads to better family health, lower fertility, and thus slower population growth. It helps workers to take advantage of technological change, which raises their productivity and earnings. Increasing the labor force's average primary schooling by even one year can increase output substantially. And because educated parents are more likely to send their children to school, primary education perpetuates the benefits from one generation to the next.

These benefits of primary education launched the takeoff of the rapidly growing economies of East Asia. But India's low average educational attainment has not yet reached the critical threshold where benefits are greatest and high economic growth rates are sustained. Reaching that threshold will take some time. At the current rate of growth in schooling, some of the largest states in India will not reach an average of four to five years of primary education until well into the next century.

Nor can education be measured solely in years of enrollment. What matters is what students learn, retain, and apply in life. Teachers are critical in students' learning, but with teachers' salaries consuming 97 percent of the primary education budget, little is left for anything else, including instructional materials and teachers' in-service training. Textbooks are also critical in students' learning, but the instructional and physical quality of textbooks in India is often poor.

Another important part of the primary education story is the great diversity in performance. Almost all students—97 percent—are in the 15 major states. Two of these states are doing very well, providing almost all their children with a primary education. But several are far behind, and six account for 25 million of the 32 million primary-school-age children not in school. Progress in the other states falls somewhere in between. Within states, too, there is diversity, with some districts faring poorly even in states that are otherwise doing well, and vice versa. There also are gaps between groups of children, with education outcomes differing between girls and boys, between the poor and the better-off, and between tribal or scheduled caste children and others.

India's goal of universal primary education of good quality points to three main challenges: expanding access, raising learning achievement, and reducing gaps in education outcomes across states and among groups. Four actions will be key in meeting these challenges:

- Increasing the financing for primary education
- Improving the preparation, motivation, and deployment of teachers
- Improving the quality of textbooks and the efficiency of their production
- Building managerial and institutional capacity.

The decentralization of authority and financing—to the states today and the districts tomorrow—makes the task of ensuring the required levels of funding problematic, the improvement of teaching and textbooks easier, and the building of local capacity essential. In all this, the central government's leadership will be more important than ever for guiding policy, sponsoring national initiatives, and transferring resources to the states while devising incentives for states to increase their education budgets.

Challenges for Primary Education

India has achieved high gross enrollment rates, but low attendance and high dropout rates mean that many fewer children complete the primary cycle than enroll in primary school. If all children are to complete a primary education of good quality, the Indian governments (national, state, and local) must create accessible schools, increase the efficiency of student flows (by reducing repetition), and provide the resources needed to improve quality. For the most difficult-to-reach children, this education may be provided through nonformal or alternative education programs.

Finding the money for this will not be easy because primary education is particularly vulnerable to today's fiscal problems, especially at the state level. Of all services that state governments provide, education invariably consumes the largest part of the budget. Primary education in turn consumes the largest part of the education budget—as it should, because as well as producing benefits directly, it also increases the effectiveness of investments in such other services as health and nutrition.

The main challenge for central, state, and district education authorities is to improve the supply, quality, and holding power of education in rural primary schools. Cost-effective strategies must be found for increasing the percentage of children ages 6–10 who complete primary school, improving their general levels of learning, and reducing gaps associated with gender, poverty, and tribal or caste affiliation. The scale and complexity of the necessary changes require that authorities and civil society at all levels continue to play a role in planning and implementation.

Expanding Access

Accommodating all children ages 6–10 in primary schools by 2007 (the final year of the Tenth Plan) could require building as many as 1.3 million classrooms and hiring 740,000 new teachers. Building schools using professionally supervised community construction and local materials can be cost-effective. Also required will be temporary measures to accommodate the primary school participation of overage students who enroll late and sustained measures to reduce repetition. Local efforts by village education committees to monitor student enrollment and school attendance could help to ensure that children who enroll in school complete their education without repeating grades or dropping out.

Enrollment data and age-specific literacy rates suggest that India has made much progress in expanding access to education: in 1993 about 100 million children were enrolled in primary school, up from 85 million in 1987. But school attendance is often irregular, and primary school dropout rates are high. About 32 million of the 105 million children ages 6–10 were out of school in 1993. About 75 percent of the children who are out of school live in six states: Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal.

Reaching full enrollment of the age group 6–10 remains a major challenge in all states of India and a distant goal in some. Although there is considerable uncertainty about the reliability of the available data on India's education system, the following picture emerges. On the positive side,

- More than 80 percent of 6 year-olds enroll in school.
- Enrollment by girls increased 20 percent between 1986 and 1993.
- About 70 percent of children ages 6–10 attend school regularly.

And on the negative side,

- Growth in enrollment between 1986 and 1993 was modest (13.8 percent), and the official gross enrollment rate increased only 4.2 percentage points to reach 95 percent in 1993–94.
- There are severe shortages of teachers and classrooms, especially in the most populous states.
- About 15–20 percent of the children enrolled do not attend school regularly.
- About 35 percent of those who enroll drop out before completing the primary school cycle.

To address this situation, the Indian government has made a commitment to the goals of the 1990 World Conference on Education for All, held in Jomtien, Thailand. It has set a goal of providing education of good quality to all primary-school-age children. And it has committed itself to ensuring that the necessary resources are available, indicating that the allocation to education will increase from less than 4 percent of gross domestic product (GDP) to 6 percent by the end of the Ninth Plan in 2002.

Improving the quality of primary education and using available resources more efficiently are priorities that no state can ignore. Several of India's states—for example, Kerala, Orissa, and Tamil Nadu—now have the capacity to enroll all children ages 6–10 and, by improving efficiency, could reach the Jomtien goals in the near future.

Other states—and districts within states—will require special attention if India wishes to make real progress toward achieving the Jomtien goals. National progress will critically depend on making progress in the six states that have three-quarters of the children who are out of school. Almost half the additional classrooms and teachers required to enroll all children ages 6–10 are needed in Bihar and Uttar Pradesh. Rajasthan has the lowest female literacy rate and the second lowest (after Bihar) proportion of children ages 6–10 attending school. Andhra Pradesh, Madhya Pradesh, and West Bengal are populous states with below-average school attendance rates. It is in these six states that the key challenges of educational development lie and that the success of the government's policy goals will be determined.

Demand-side interventions may be needed to encourage the regular attendance of children in school. One possible approach is to enforce compulsory attendance laws in states where enrollment rates are relatively high. Another is to create demand for attendance, through midday meal programs, attendance scholarships, or awareness campaigns. Researchers have found that the midday meal program has positive effects on learning achievement in Madhya Pradesh, and attendance scholarships have been effective in Kerala. Although more research is needed to assess the effects of these benefits and more selective targeting may be necessary to improve their cost-effectiveness, these strategies could help poor families meet the costs of schooling. Probably more important, however, is to provide schools that parents perceive to be of sufficient quality to be worthwhile.

Enhancing Learning Achievement

Learning achievement in India is low. Children who reach the final year of lower primary school (grade 4 in some states and grade 5 in others) often have mastered less than half the curriculum. Studies around the world show that parents' investing in their children's education may be the most effective way to boost learning achievement. But poverty limits the ability of many Indian parents to make the necessary investments, such as purchasing books and supplies and forgoing their children's labor. So, for the foreseeable future, strategies for raising learning achievement will need to focus on improving the quality of education in schools. What is most effective in doing this varies across states and districts, making it important to enable states, districts, and even schools to make their own decisions about which inputs to invest in.

Increasing learning achievement requires building on knowledge about the factors that affect learning and their costs in India.

- Most important is the opportunity to learn: time spent in school, with the teacher present and providing instruction, and time spent doing homework.
- Teachers' subject knowledge is the most critical factor in teacher quality.
- Teaching practices matter.
- School factors associated with higher learning achievement vary by location.
- Good school facilities and sufficient classroom space are associated with higher achievement.

- Even modest teaching tools—such as textbooks, libraries, and classroom instructional materials—are significant determinants of achievement.

- Some popular investments do not boost achievement.

Supply-side (school-level) interventions to increase instructional time, provide a physical facility for learning, provide better-educated teachers, and ensure that students and teachers have appropriate instructional materials deserve the highest priority in developing strategies to raise learning achievement. Cost-effectiveness analysis can help identify specific inputs appropriate for different local conditions. Because teachers' attendance is a strong predictor of students' learning, strategies that more closely link teachers' salaries to their work performance could also be considered. The new *panchayati raj* institutions at the district, subdistrict, and village levels could play a role in such strategies.

Considerable variation across states, districts, and schools means, however, that packages of interventions identified locally to meet the needs of specific schools are more likely to be cost-effective than are uniform packages. What is effective in a state with a higher level of educational development may differ from what is effective in a state with a lower level of development. Recognizing this, the government of India has established a program, now being implemented in most of the major states, to support the local development of primary education.

Particularly important is the need to improve the quality of rural primary schools, where more than 78 percent of children are educated. Providing better services should not only directly improve learning achievement, it should also increase the schools' attractiveness to children and parents alike and thus increase enrollment and attendance.

Achieving acceptable levels of quality will require strategies that take into account variation in access, completion, and learning achievement in primary education within and among states. Strategies also need to take account of the fact that girls, the poor, and students from scheduled castes and tribes tend to stay in school for the shortest period and to score below average.

Reducing Gaps in Enrollment, Retention, and Achievement

Gaps in education outcomes persist in India between girls and boys, between the poor and the better-off, and between children from scheduled castes or tribes and other children. Poverty partially explains the gaps between genders and between caste and tribal groups, and poverty-reducing interventions would probably help to narrow them. But such interventions have been insufficient and poorly targeted: it would be more efficient to target them to all poor students, regardless of gender or caste or tribal status. Other constraints contributing to gaps in education are more cultural than economic. These constraints—and appropriate strategies for addressing them—vary among disadvantaged groups and, for tribal students, within them.

In India the gender gap is due to a mix of cultural and economic constraints and could be reduced through awareness campaigns, child-care centers, direct incentives, and the hiring of more female teachers. Although the caste gap is due largely to poverty, welfare-based interventions may be more efficiently directed at the poor, regardless of caste status. To close the tribal gap, which stems from a complex combination of economic and cultural factors, non-welfare-based interventions focusing on cultural factors will continue to be appropriate.

International evidence shows that education gaps narrow for two main reasons: enrollment gaps close as the education system expands to provide access to all, and achievement gaps (including differences in attendance and retention) close when the education system targets interventions selectively.

Five Essential Actions for Expanding Access and Improving Learning

Five actions are crucial for expanding access and improving learning in India's schools: providing more financing for primary education; improving the preparation, motivation, and deployment of teachers; improving the quality of textbooks and the efficiency of their production; strengthening management and institutional capacity; and strengthening the leadership of the central government.

Increasing Financing for Primary Education

Over the past two years, the Indian authorities—at both the center and the state level—have frequently reiterated their intention to ensure that public resources for education increase to 6 percent of GDP over the period of the Ninth Plan (1997–2002). In 1993–94 total spending on education by central and state departments of education was 3.5 percent of GDP, down from 3.8 percent in 1989–90. As a share of GDP, spending on elementary education was 1.6 percent in 1993–94. So, both the center and the states need to increase significantly their allocations to education. This will be very difficult unless the fiscal performance of the public sector improves substantially.

Nevertheless, providing all children with a better primary school education is within India's grasp. Many states have identified and applied successful strategies for providing schools, classrooms, teachers, textbooks, and other instructional materials to reach this objective, and these strategies could be adapted and used in other states. Many states have found avenues for cooperation between public and private institutions in training teachers, constructing and managing schools, and producing and distributing textbooks; these lessons too could be applied in other states.

With conservative assumptions about economic growth, 80 percent of the resources required for universal primary education would be available a decade from now if past trends continue. But three problems must be resolved before universal primary education can be reached. First, states need to learn more from one another about successful strategies. Second, a means needs to be found for transferring resources to the states with the highest share of children out of school. Third, strategies for increasing the demand for primary education need to be explored to ensure that the places created in primary schools are used.

The trends in revenue deficits in the major states and the falling share of development expenditures suggest that boosting budgetary resources for education will require significant changes in the conduct of fiscal policy, such as increasing revenues, restructuring expenditures, and providing schooling cost-effectively. A combination of strategies could be considered. In line with agreements reached with the government of India as reflected in the 1995 country economic memorandum (published as World Bank 1995a), these include:

- Developing a wider revenue base to improve resource mobilization.

- Allocating at least the share of plan expenditure for primary education projected for the Eighth Plan period and preparing for significant increases (as planned) in the share under the Ninth Plan beginning in 1997.

- Increasing the spending on education through a general restructuring of total expenditures. (There is scope for such restructuring: losses by the state electricity corporations are two and a half times the total state plan expenditures on education.)

- Developing financial arrangements for the planned third tier of government, the district level, to ensure that adequate financing is developed for these governments' responsibilities in education and that there are incentives not to divert such funds. Inequalities within states will have to be addressed through policies that effect differential transfers from the state to lower levels of government. And local governments will have to be enabled to raise additional revenues from taxes that may be less available to state governments.

In addition,

- Focusing on reducing repetition and dropout rates to reduce the cost per graduate. Lowering repetition rates would make it possible to accommodate many more students for marginal increases in expenditure.

- Reviewing the efficiency and effectiveness of incentive programs. Even without the school feeding programs, twice as much is spent on incentive programs as is spent on all nonteacher school inputs. The little evidence that exists suggests that several of the major components of incentive and scholarship programs tend to be inefficiently administered and have no real effect on enrollment and retention. More effective might be the free distribution of higher-quality textbooks.

Overall, governments of educationally backward states may be able to increase the growth rate of expenditures on primary education if economic growth rates are buoyant and public finances are restructured. But growth rates in these states would need to double, which is probably not realistic. To augment the efforts of the state governments, the central government could increase its support to these states.

Improving the Preparation, Motivation, and Deployment of Teachers

Improving teachers' performance is the most important challenge in primary education in India. Teachers' salaries claim by far the largest share of state education budgets. Teachers are the principal instructional instrument in most schools, and their performance falls short of what is needed to ensure that all children complete primary school with adequate learning.

India's governments have done much to improve the quality of the teaching corps. They have raised pre-service education requirements, improved teacher training, and increased the diversity of the teaching force (although not enough to match the diversity of the students). As a result of historical deficiencies in teachers' education and training and poor performance incentives, however, many teachers still have little understanding of the material they teach, have few teaching skills, and are poorly motivated. Teachers are frequently absent from school, because of poor motivation or competing administrative demands on their time. Thus, in the next decade an essential task will be to improve the preparation, motivation, and deployment of teachers.

What will it take to improve the performance of teachers? Here are five strategies that could have high payoffs:

- Implementing teacher qualification standards that extend the length of pre-service general education and increase teachers' knowledge

- Shortening the duration of pre-service teacher training and shifting its emphasis to building teaching skills

- Sustaining state-level and district-level provision of continuous, school-based in-service training

- Improving the conditions of teaching and making career advancement and promotion contingent on performance

- Increasing the share of female teachers and teachers who speak local languages, which is especially important for girls and students from scheduled tribes.

Improving the Quality of Textbooks and the Efficiency of Their Production

India supplies textbooks to almost all its primary students—often at no cost—but the quality of the textbooks leaves something to be desired. The instructional quality and readability of many are low. The physical quality is often poor. And in many states children carry too heavy a load (both physical and cognitive) of textbooks. Improving textbooks is critical: they are the main instructional aid in India's primary schools, they carry the curriculum for both students and teachers, and for most students they are the only available reading material. There also is a need for increased efficiency in the production and distribution of textbooks. For many of the quality and efficiency issues, the solutions can be found within India. Studies have found good practices in one or several states in most aspects of textbook development and publishing.

Among the examples are the good use of the private sector for printing and distribution in Uttar Pradesh, better pay for textbook writers in Karnataka, simpler and more readable texts in Maharashtra, Tamil Nadu, and Assam, and limitations placed on the number of pages assigned and printed in Kerala. Each state will need to select combinations of reforms that suit local circumstances, building on present strengths and changing practices in key areas. The changes called for should be feasible for each state, given that a large share of improved practices have been put in place in other Indian states.

As could be expected, new practices are also called for. Some are needed to take advantage of the potential for improved efficiency that is emerging with the adoption of minimum levels of learning standards by all states and is making cross-border sales more feasible. Others are needed to help the textbook publishing industry evolve toward international standards of practice. The three most promising areas are: adopting strategies to improve quality, establishing autonomous textbook corporations, and reducing the cost of providing textbooks as the result of heightened involvement of the private sector.

Three relatively straightforward actions would do much over time to produce more readable, more effective textbooks:

- Setting standards for vocabulary and for sentence complexity and length
- Conducting simple trials of readability and comprehension with students and teachers
- Investing more in research, writing, and design.

In many states the fragmentation of authority for textbook publishing raises costs and lowers effectiveness. Financially autonomous textbook corporations such as the one in Tamil Nadu offer three key advantages:

- Instituting financial controls
- Improving quality control
- Using flexible staffing strategies.

In India, as elsewhere, there has been a tendency to manage the costs of textbooks by reducing the quality of manufacturing. Six alternative strategies may prove more fruitful:

- Increasing the financial accountability of textbook corporations
- Reducing the number of pages in each textbook
- Increasing the amount of competition in printing
- Letting printers purchase paper
- Encouraging cross-border sales
- Expanding the private sector's role in distribution.

Strengthening Management and Institutional Capacity

Strengthening the managerial and institutional capacity of the education system typically requires improving organizational structures, developing institutional capacity, and strengthening information systems. Although progress on all these issues is still needed. India has made significant strides in addressing them in four ways:

- Establishing, through the 73rd and 74th amendments (enacted in 1992) to the Constitution, *panchayati raj* institutions in all states and devolving responsibility for primary education to district-level *panchayats*
- Training district-level planners, village education committee members, and school headmasters and head teachers involved in the District Primary Education Program
- Strengthening state and district education institutions to provide support at the block and village (school) level
- Establishing a management information system to provide more accurate and timely education data for use at all levels.

The management of education in India should soon change dramatically as responsibility is devolved to *panchayati raj* institutions. This devolution is likely to lead to much uncertainty as states sort out which responsibilities they should transfer to these institutions and which they should retain. It will also create new needs in training and technical support for the *panchayati raj* institutions, many of which have little experience in managing education.

Institutions at all levels will see their functions change, and district-level personnel, school headmasters, and village education committees will acquire many new responsibilities or receive formal authority to carry out complex tasks that they already perform. These shifts in responsibility need to be accompanied by careful planning to prevent the administrative weaknesses that arise when managers lack sufficient authority or resources to do their jobs effectively, when lines of communication are blocked, when roles and responsibilities are unclear, or when managers' time is consumed by routine tasks.

Strengthening the Central Government's Leadership

India's central government is responsible for developing many aspects of policy and for funding centrally sponsored plan schemes in primary education, and it provides general financial transfers to states. Its allocations to education under the Ninth Plan are slated to increase significantly, particularly for elementary education.

The central government has increased its role in support of primary education since 1986, mainly by supporting interventions to improve learning achievement. It has employed both uniform and specially tailored interventions. First, centrally sponsored schemes to strengthen basic education have supported such relatively standard interventions as Operation Blackboard for small rural schools, a national research and development program to help states establish minimum levels of learning in core subjects, district institutes of education and training to provide professional support to teachers, state-level programs of nonformal education, and total literacy campaigns. Second, recognizing the role of location-specific factors in educational achievement, the central government launched the District Primary Education Program in 1993 to increase enrollment, retention, and the quality of primary education through district-designed activities and performance-based resource allocation specially tailored to meet local needs.

The analysis in this book suggests that the central government will need to expand its role in primary education in the medium term for three reasons: the low level of resources devoted to primary education by many state governments and the large number of children out of school; the importance at this stage of the country's educational development of capacity-building in states and districts to plan and manage education more effectively; and the need for substantial research to select cost-effective strategies.

Gradually expanding the District Primary Education Program, paying careful attention to cost-effectiveness, will be essential during the medium term to provide a bridging mechanism as states undergo fiscal reforms. Untied grants to states for educational development might also be considered under terms that do not allow substitution and that require a commitment by the state government either to increase the growth of its education spending (for low-spending states such as Haryana) or to maintain the share of education in total spending (for high-spending states such as Kerala) and generally to shift expenditures toward the social sectors.

The central government might also wish to address educational inequality across states more broadly. It could focus the criteria for distributing general transfers more on need, balanced by an increased emphasis on equal fiscal effort across states. And it could target grants for the centrally sponsored schemes to ensure that states which have made strong efforts to raise revenues and allocate expenditure toward the social sectors are not penalized and that those which have not tried to raise revenues or which have expenditure patterns biased against the social sectors are not rewarded.

India faces these challenges with four assets. The first is an expanded primary education system that has put the basic elements of schooling within reach for many children. The second is a strong policy framework with significant commitment from the central and state governments. The third is an innovative and initially well-financed reform program aimed at strengthening primary education, with a strong focus on quality. And the fourth is an educational research and development community increasingly engaged with the problems of primary education.

CHAPTER ONE

Introduction

The vision of education for India is contained in article 45 of its Constitution: "free and compulsory education for all children until they complete the age of 14." Since independence, India's governments have expanded the provision of primary formal and nonformal education to realize this vision and have attained high gross enrollment rates in primary schools. But India has come late to its emphasis on primary education compared with some countries, where focusing on primary education has helped achieve high economic growth with equity and sharply reduce poverty. Although a large share of school-age children in India enroll at the beginning of primary school, about 40 percent drop out before completing the cycle. Learning achievement is low. Despite progress in improving equity, gender and caste disparities persist in most education indicators. And as could be expected in a nation of India's size and diversity, there are wide variations between and within states in the efficiency and equity of primary education. This book reviews India's recent efforts to remedy past problems, the current status of education in India, and the remaining challenges.

The overall challenge for India is to sustain and deepen current reforms in primary education in an era of fiscal adjustment and increasing administrative and political decentralization. Strategies for expanding and improving primary education will need to be planned and managed locally to address the diverse constraints on primary education, with a sharper focus on cost-effectiveness.

In India primary education is the concurrent responsibility of the central government and the states. In many states this responsibility is not adequately fulfilled, and primary education is underfunded. To achieve national policy objectives in education, states will need to improve their fiscal performance and devote more resources to primary education. And at least in the medium term, the central government will need to continue to support state efforts. An important challenge is to devise the most effective mechanism for this support.

This chapter describes the education system in India and gives a brief overview of national and state reform efforts. It also identifies key issues that need to be addressed if the people of India are to realize the benefits—personal, social, and economic development with equity—arising from universal primary education of good quality. The rest of the book addresses the following questions:

- Why is investing in primary education important (chapter 2)?

- What are the remaining challenges? Specifically, the study examines the need to increase access and efficiency (chapter 3), the need to improve learning (chapter 4), and the need to reduce equity gaps (chapter 5).

- What is required to expand and improve primary education? The study examines the need to provide more classrooms and teachers (chapter 3), better teachers and teaching (chapter 6), and better textbooks (chapter 7).

- What will it take to expand and simultaneously improve primary education? The answers explored here are to decentralize planning and management and offer high-level technical and administrative support (chapter 8) and to direct more resources toward primary education (chapter 9).

- Finally, how can India afford what is needed (chapter 10)?

Progress and Prospects

India's education system today is in large part a consequence of its past. As late as 1931 the literacy rate in India remained appallingly low, at less than 10 percent among all adults and no more than 2 percent among women (Parulekar 1957). Little growth in literacy had occurred since 1881 (see table 1.1). At independence in 1947, fewer than 15 percent of the adult population was literate. Literacy grew slowly over the next four decades, and in 1991 the literacy rate for adults (persons over age 7) was 52 percent, well below rates in East Asian economies when they began accelerated integration with the world mar-

TABLE 1.1 LITERACY RATES, INDIA, SELECTED YEARS, 1881–1991
(percent)

Year	*Literacy rate*
1881	6.3
1911	7.3
1931	9.3
1951	18.3
1961	28.3
1971	34.5
1981	43.7
1991	52.2

Note: Literacy rates for 1881–1931 are for persons 10 years old and above, rates for 1951–71 are for persons 5 years old and above, and rates for 1981 and 1991 are for persons 7 years old and above.

Source: For 1881–1931, Parulekar 1957; for 1951–91, India, Ministry of Human Resource Development, 1993a.

ket. For example, in 1961 the Republic of Korea's literacy rate was 71 percent and Thailand's was 68 percent.

In 40 years India went from having 52 million literates to having 350 million literates (Nanda 1992), but the rise in the literacy rate did not mean that there were fewer nonliterates. In 1981 there were 121 million nonliterate males and 181 million nonliterate females in India, and by 1991, these numbers had grown to 127 million and 197 million, respectively.

The Engine of Literacy Growth: Rising Enrollment

The engine of the growth in literacy was the expansion of primary education. India's education system is the second largest in the world, although its exact size is subject to debate. According to provisional statistics from the Sixth All-India Education Survey, 98 million children were enrolled in 575,000 lower primary schools in 1993, another 34 million in 161,000 upper primary schools, and 22 million in 90,000 secondary schools (NCERT 1995). Roughly 5 million students were enrolled in nearly 8,000 institutions at the tertiary level (India, Ministry of Human Resource Development, 1994c). In all, 18 percent of India's population was enrolled in school, up from 7 percent in 1951. At all levels, some private schools—about 40 percent of urban primary schools and more than half of all secondary schools in 1987 were private—offer a first-class education to those who can afford the fees.[1] The success of the Indian education system is reflected in its sheer size and in its graduates, who are found in all professions in all parts of the world.

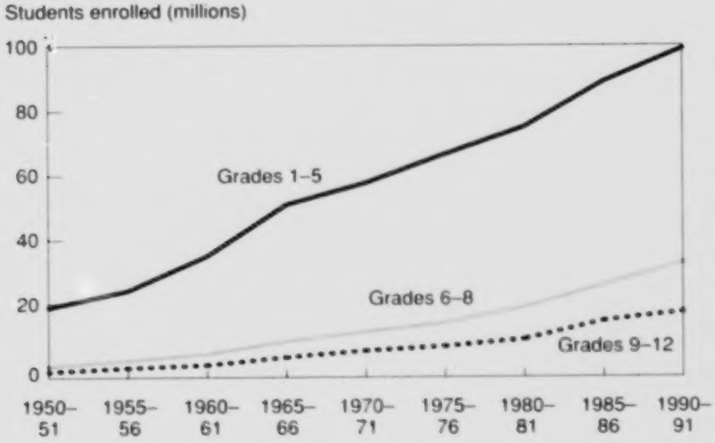
But this book is not about the successes of India's private, urban, secondary, or tertiary education. It is about how to provide primary schooling or its equivalent for all 105 million children of primary school age—a third of whom do not attend school—and how to improve the quality of the more than 500,000, mostly public, schools serving the rural poor in India.

The structure of public schooling varies across states, although in most it follows a similar pattern. Elementary education covers grades 1 to 8, with upper primary school beginning at grade 5 in some states and grade 6 in others. Lower secondary covers grades 9 to 10, and upper secondary covers grades 11 to 12. All elementary subjects typically are compulsory, while some secondary subjects are elective in grades 11 to 12. Schooling is nominally compulsory in 14 states and 4 union territories.[2]

Enrollment has grown at all levels since the 1950s (see figure 1.1). Nevertheless, at least 32 million poor rural primary-school-age children do not attend school, even in states with high participation rates (see box 1.1).

Enrollment has been growing steadily at all levels.

FIGURE 1.1 ENROLLMENT IN PRIMARY, UPPER PRIMARY, AND SECONDARY SCHOOLS, INDIA, SELECTED YEARS, 1951–96



Source: India, Ministry of Human Resource Development, 1994c.

BOX 1.1 WHY THE CHILDREN IN A FISHING VILLAGE IN KERALA DID NOT ATTEND SCHOOL

In Kayipady, a fishing hamlet in Kerala, not one of the 250 children ages 5–14 was enrolled in school in April 1995. The nearest primary school was only 3 kilometers away, at Kumbla, but the people of Kayipady preferred not to send their children there. Why? To reach school, the children had to wade a river, cross the main railway line, and then cross the main highway twice. Concerned for their children's safety, parents kept them at home. When a school was established in Kayipady in July 1995, 185 children ages 5–10 enrolled in grade 1 (DPEP 1995).

In the late 1980s, growth in primary enrollment began to lag. Growth in schools and in enrollment was slower at the primary level than at the upper primary and secondary levels and was lower in rural than in urban areas, which was consistent with past trends (see table 1.2).

Recent government and survey data for all of India and the 15 largest states show that gross enrollment rates in 1993 exceeded 95 percent (NCERT 1995). Literacy stood at 52 percent in 1991, 64 percent for males and 39 percent for females (Nanda 1992). The education participation rate for children ages 6–10 stood at 68 percent, with 76 percent of boys and 61 percent of girls surveyed reporting being in school (IIPS 1995). Official primary school dropout rates were 39 percent for girls and 35 percent for boys (India, Ministry of Human Resource Development, 1993a).

India has made much progress toward universal primary education and could achieve nearly universal—95 percent—primary net enrollment rates by 2005. But that will be at least two decades later than in such countries as Indonesia and Malaysia and three decades later than in the Republic of Korea (see figure 1.2).

Together, these figures reflect the enormous gains that India has made in education since independence and the significant challenges that it still faces. India is addressing these challenges through recent policy reforms that build on experience.

National Policy and Central Schemes

Working groups of the Planning Commission established ambitious target dates for achieving universal elementary education, targets that were revised throughout the 1960s and 1970s. In 1966 the Kothari Commission proposed achieving the goal no later than 1986. This target, too, was superseded when the 1986 National Policy on Education articulated a goal of ensuring that by 1990 all

TABLE 1.2 GROWTH IN SCHOOLS AND ENROLLED STUDENTS, BY GEOGRAPHIC LOCATION, INDIA, 1986–93

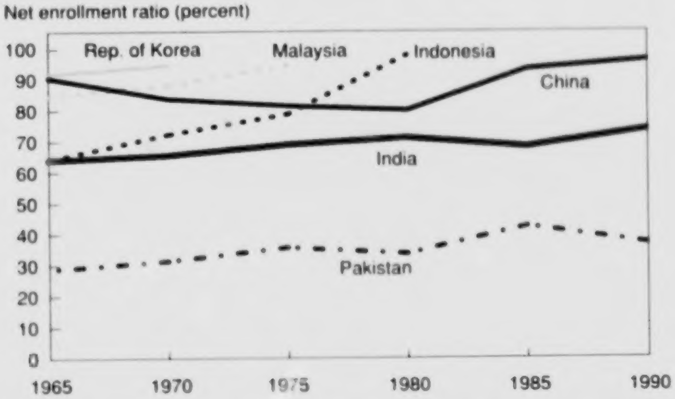
(percent)

Level	*Rural*	*Urban*	*Total*
Schools			
Primary	7.6	19.6	8.8
Upper primary	13.1	27.5	15.8
Secondary	24.2	30.5	25.8
Higher secondary	63.1	42.7	52.1
Students			
Primary	11.6	20.9	13.8
Upper primary	21.8	30.5	39.9
Secondary	30.9	34.5	32.5
Higher secondary	45.5	33.9	37.7

Source: NCERT 1995.

India will reach full primary enrollment later than other fast-growing Asian economies.

FIGURE 1.2 PROGRESS TOWARD 95 PERCENT PRIMARY NET ENROLLMENT, SIX ASIAN COUNTRIES, 1965–90



Note: Figures for India for 1985 from Fifth All-India Education Survey (FAIES) and for 1990 from World Bank staff estimates.

Source: Lockheed and Verspoor 1991; NCERT 1992b; IIPS 1995; World Bank 1995c; Warwick and Reimers 1995.

children 11 years of age would have completed five years of formal or nonformal education (Mehta 1994b).

A key strategy for achieving universal elementary education has been to provide an alternative to formal schooling for working children and girls not in school. In 1978 the Department of Education established a program of grants to states to develop nonformal education classes. These classes are held at times convenient to the children, usually in the early evening, and are led by an educated instructor who receives training and a stipend from the state government. State nonformal education resource centers prepare learning materials and teachers' guides and provide these to the teachers, along with a blackboard and a kerosene lamp. Classes are held in instructors' homes, after hours in schools, or in other public buildings. A supervision and support system of trained officers that operates parallel to the supervision structure for formal schools has been established down to the block level.

The 1986 National Policy on Education set the stage for the central government to play an increasingly important role in primary education. The policy explicitly recognized the need to make a concerted effort to expand and improve basic education, meaning formal and nonformal primary and adult literacy education. At the primary school level, the policy gave priority to reducing the disparities in enrollment for girls and for students from scheduled castes and scheduled tribes. To carry out the policy, the Department of Education created a set of centrally sponsored grant schemes to assist states in developing basic education (see box 1.2).

State Projects

Assisted by donors, states also have initiated basic education projects. Building from experience with the Andhra Pradesh Education Project, which began in the early 1980s with the support of the United Kingdom's Overseas Development Administration (ODA), Bihar (United Nations Children's Fund, UNICEF), Rajasthan (Swedish International Development Authority), and Uttar Pradesh (International Development Association, IDA) started projects between 1990 and 1993. Although these projects vary substantially in design, they all share the objectives and strategies of the 1986 policy. They focus on increasing girls' enrollment and improving educational outcomes, and they include features to strengthen community involvement with schools through village education committees, to improve teaching and learning materials, and to improve in-service teacher training, with district institutes of education and training playing key roles. In each state, registered societies have been created to receive and disburse funds and to provide an umbrella organization, closely tied to state education departments, for project implementation.

BOX 1.2 CENTRALLY SPONSORED SCHEMES TO IMPLEMENT THE NATIONAL POLICY ON EDUCATION

To implement the 1986 National Policy on Education, the Ministry of Human Resource Development/Department of Education initiated a series of grant programs (or centrally sponsored schemes) to assist states with the development of primary education (India, Ministry of Human Resource Development, 1993a).

Operation Blackboard: 1986

The Department of Education established Operation Blackboard to counter conditions seen as constraints on retention and learning: the large number of single-teacher schools, the lack of female teachers, and the inadequacy of teaching materials and aids. The scheme provides grants to states to construct an additional classroom and post an additional teacher in single-teacher schools, requiring that half the teachers posted be women. It also provides grants to finance the purchase and distribution by the state of a predetermined, standardized package of teaching materials and aids.

District Institutes of Education and Training (DIETs): 1988

Recognizing that professional support for teachers would improve their effectiveness, the Department of Education established a scheme to finance the creation of institutes of education and training in all rural districts by converting existing teacher training institutes and constructing new ones. All DIETs follow a standard organizational model, with departments for teacher education and training, planning and management, research and evaluation, curriculum and materials development, educational technology, and work experience education.

Total Literacy Campaigns: 1988

After an unsuccessful attempt to provide adult literacy instruction, along with vocational skills training, through formal classes, the Department of Education turned to total literacy campaigns to increase adult literacy. Overseen by a national Literacy Mission board, the literacy program provides grants to district administrations for organizing intensive campaigns to mobilize large numbers of volunteers. State resource centers develop literacy materials and training courses for volunteer instructors.

Minimum Levels of Learning: 1989

Inappropriately complex and difficult primary curricula and textbooks were recognized as a barrier to learning and a factor in decisions to drop out. To address this problem, the Department of Education initiated a national research and development program to identify, for each state, basic competencies in language, mathematics, and social and environmental studies to be taught in the primary grades. Known as minimum levels of learning, these competency statements have been largely completed and tested; they are ready to form the basis for new curricula and a new generation of primary textbooks in the states.

BOX 1.3 DISTRICT PRIMARY EDUCATION PROGRAM

In 1992 the Central Advisory Board on Education (CABE) completed a revision of the National Policy on Education of 1986, calling for an integrated approach to primary education development focused on the district level. The result has been the District Primary Education Program, the most intensive effort by the central government to increase enrollment, retention, and quality in primary education. The program targets investment to districts with below-average female literacy rates and decentralizes planning to districts to encourage popular participation. Although the DPEP finances some new school construction, it emphasizes investments in the quality of primary instruction, particularly in-service teacher training, improved teaching and learning materials, and improved school facilities. The program is strengthening community and school organizations and replacing the Operation Blackboard materials approach with grants to these organizations and to teachers for the purchase of materials. The program is also enhancing state education support programs, including textbook development and publication, planning and management, research and evaluation, and teacher training.

The DPEP is managed at the national level by the newly created DPEP Bureau in the Ministry of Human Resource Development. The bureau serves as a financial and technical intermediary, appraising, financing, monitoring, and supervising state and district action programs. The DPEP finances 85 percent of state and district expenditures, with the balance provided by state budgets on the basis of seven-year district and state investment plans. The DPEP also finances

Decentralized Education Development and the District Primary Education Program

In 1992 Parliament approved an updated National Policy on Education. The new policy sharpens the priorities for girls' education and for improved quality in primary education. It also calls for an integrated and decentralized approach to developing primary education systems, with a focus on building the capacity of districts to plan and manage primary education.

The call to strengthen the capacity of districts paralleled 1992 constitutional amendments that increase the responsibility and authority of local governments. These amendments gave the control of primary, secondary, adult, nonformal, technical, and vocational education to *panchayati raj* bodies. The Central Advisory Board of Education issued a special report on how to decentralize the management of education, detailing the structure, role, functions, and powers of local bodies. The objective in transferring management author-national technical assistance and research and development programs to support the development of state institutional capacity. Implementation progress is monitored annually and serves as the basis for annual budgetary allocations to district and state subprojects. Learning achievement and dropout indicators are monitored every three years against baselines established for each participating district. As the program achieves full coverage of districts for lower primary education, it could expand to cover upper primary schooling.

The DPEP differs in five principal ways from other centrally sponsored schemes, which provide resources to states for programs that follow standard designs: (1) proposals for financing subprojects are developed by each participating district and state; (2) proposals are appraised by the DPEP Bureau against technical, managerial, and financial criteria; (3) participating states must make DPEP grants fully additional to normal growth in education budgets; (4) funds are made available to states and districts annually on the basis of performance reviews and proposals for the next year, and poorly performing subprojects can be dropped from the program and replaced; and (5) implementation support and technical assistance are made available to states and districts through contracts with research and development agencies.

The DPEP will be the channel for all substantial external assistance to primary education. The European Union provided a grant of ECU150 million to the DPEP in 1993, and the World Bank approved IDA credits of $265 million in 1994 and $425 million in 1996. In addition, the United Kingdom's ODA is planning to support DPEP in two states.

ity to local bodies is twofold: to improve the efficiency and effectiveness of schools and to promote democratization at the local level (India, Ministry of Human Resource Development, 1993e).

Almost all states have passed enabling legislation for the constitutional amendments, and administrative guidelines for decentralization are being issued. Recent studies on the potential impact on primary education suggest that decentralization would increase local support for mobilizing resources, particularly for school construction and nonsalary recurrent costs, improve supervision and control over schools and teachers, and increase school enrollment and reduce dropout rates (Jain 1995c). Research will be needed to evaluate the effect of the legislation on these outcomes as it is implemented.

In close consultation with the states, the Department of Education established the District Primary Education Program (DPEP) in 1993 to implement the recommendations of the revised policy (see box 1.3). The designs of the DPEP management and interventions draw on experience gained through the central schemes and, most important, the state projects in Andhra Pradesh, Bihar, Rajasthan, and Uttar Pradesh. The program finances quality improvement projects that are planned at the district level and emphasize improving inputs and strengthening community participation. The DPEP was launched in seven states in 1994 and expanded to three more in 1996.[3] With the four state projects, India has now initiated significant action in 14 of its 15 largest states.

In creating the DPEP, the government of India seeks to accomplish several broad objectives. First, while recognizing that states will need to bear the main burden of managing and financing primary education, the government wishes to create a transitional mechanism for providing financial and technical assistance to build state and district capacity during a period in which states are both implementing new forms of decentralized management in education and undergoing fiscal adjustment and reform. Second, the government seeks to initiate action rapidly in a large number of states. Third, it seeks to develop a program that would enhance the capacity of national educational research and development institutions to provide an empirical basis for program design and evaluation and to take an active role in developing counterpart agencies in the states. Finally, the government wishes to have a single window for external assistance to facilitate coordination of the substantial amounts expected.[4]

Remaining Challenges

Universal primary education of good quality is key to boosting economic growth while also improving equity in India's liberalizing economy. Completing a good-quality primary education and acquiring basic skills will be essential in enabling India's poor to participate in growth and benefit from health and family welfare services. In the medium term more and better primary education for girls will help families realize their desired size, which will improve family health and slow population growth. And slower population growth will make it easier for states to mobilize the resources needed to improve and expand educational opportunities.

India has made substantial gains toward achieving these important benefits, but it still needs to address four overarching issues in education—access, efficiency, learning achievement, and school quality—as well as specific challenges in reform. In addressing these challenges, India can draw on a base of solid assets.

Access

Access to primary schooling varies across states, within states, and by gender and social class. Differences among states in primary education coverage largely reflect differences in population growth trends. The annual rate of population growth (based on the 1991 census) ranges from 1.3 percent in Kerala to 2.5 percent in Uttar Pradesh. As a result of these growth rates, between 1995 and 2005 the number of children in Kerala in the age group 6–10 will decline from 2.8 million to 2.4 million, while in Uttar Pradesh the number will increase from 19.6 million to 24.0 million.[5] With a smaller primary school cohort, Kerala can invest a fixed share of budgetary resources while still improving the quality of primary education and expanding secondary education. In contrast, Uttar Pradesh will have to increase primary education's share in the state budget just to keep pace with population growth.

Over the past 40 years, much has been achieved in improving equity between boys and girls in primary education. During 1981–91 primary enrollment for girls grew 3.7 percent a year, while for boys it grew 2.5 percent a year. But gaps remain, as discussed in chapter 5. The male literacy rate for persons ages 7 and above is nearly double the female rate.

Children from the poorest families and rural girls are most likely to be out of school. A third of rural children ages 6–10 are not in school, and half the urban children not in school are from the poorest 20 percent of households.

Efficiency

According to official government statistics, 65 percent of all boys and 60 percent of all girls who enroll in school complete the first five-year cycle of primary schooling. Completion rates vary widely, however—from 40 percent in Bihar to 84 percent in Tamil Nadu to virtually 100 percent in Kerala (see table 1.3). Rural dropout rates are higher than the national averages. Of the children who complete the first five-year cycle of primary schooling, 77 percent of boys and 69 percent of girls progress to upper primary school, equivalent to about 46 and 28 percent of their age cohorts. Only 35 percent of children who enroll in grade 1 are enrolled in grade 8 eight years later.

Learning Achievement

Children who do reach the final year of lower primary school often have low learning achievement, as discussed in chapter 4. In a 1991 study in 23 states, the National Council of Education Research and Training (NCERT) found that the average achievement on curriculum-based basic skills tests of arithmetic, reading comprehension, and spelling for a sample of 65,000 urban and rural students in grade 4 was 46 percent. Students correctly answered fewer than half the questions on an arithmetic test in 19 of the 23 states and fewer than half the questions on a reading comprehension test in 16 states. In 15 of 21 states they

TABLE 1.3 OFFICIAL ENROLLMENT AND DROPOUT RATES FROM PRIMARY SCHOOL AND ADULT LITERACY RATES, 15 MAJOR INDIAN STATES, 1991 AND 1993
(percent)

State	*Gross enrollment rate, 1993*	*Dropout rate, 1993*		*Literacy rate (ages 7 and above), 1991*	
		Male	*Female*	*Male*	*Female*
Andhra Pradesh	93	42	42	55	33
Assam	93	—	—	62	43
Bihar	73	62	66	53	23
Gujarat	106	42	51	73	48
Haryana	84	2	7	69	40
Karnataka	119	37	44	67	44
Kerala	96	0	0	94	86
Madhya Pradesh	98	23	35	58	29
Maharashtra	119	24	32	77	52
Orissa	101	53	52	63	35
Punjab	85	21	23	66	50
Rajasthan	85	35	56	55	20
Tamil Nadu	144	16	18	74	51
Uttar Pradesh	76	20	20	56	25
West Bengal	104	36	46	68	47
All India	96	35	39	64	39

— Not available.

Source: For gross enrollment rates, NCERT 1995; for dropout rates, India, Ministry of Human Resource Development, 1993a; for literacy rates, Nanda 1992.

correctly spelled fewer than half the words on a spelling test. Yet students are expected to achieve all of the skills tested by the end of grade 4. Recent studies in 43 low-literacy districts in eight states found even lower levels of learning achievement.

School Quality

The quality of rural schooling is often inadequate, as reflected in low levels of learning achievement and high dropout rates. But there is a good base of accomplishments on which efforts to improve quality can build. Primary teachers have more education than their counterparts in many developing countries. Virtually all children in school have textbooks, about half of primary students receive them at no cost and the rest receive them at subsidized rates, and most students get their books at the beginning of the school year. Most communities have some basic school buildings. These are enormous accomplishments and crucial resources. But the quality of these key learning resources could be substantially improved. Teachers are not trained for the challenges of teaching young children, teaching multiple grades, or teaching in small rural schools. Textbooks often are too difficult for students—and sometimes for teachers—to read, and supplemental instructional materials are in short supply. Rural schools often are in poor repair, lack water supply and sanitary facilities, and have an average floor space per pupil well below norms. These issues are addressed in chapter 4.

Assets

India faces these challenges with four assets. The first is an expanded primary education system that has put the basic elements of schooling within reach of many children. The second is a strong policy framework that has significant commitment from the central and state governments. The third is an innovative and initially well-financed reform program aimed at strengthening primary education, with a principal focus on improving the quality of schooling. The fourth is an educational research and development community that is increasingly engaged with the problems of primary education.

The Basics of Reform: Specific Challenges

To stay the course, and increase the pace of improvement, the central, state, and local governments will need to focus clearly on the basics of school reform: what is required to get children into school, to keep them for the full primary cycle, and to enable them to learn. The specific challenges are many, but the following stand out as having considerable early priority. Each is taken up in the chapters that follow.

UNDERSTANDING THE ECONOMIC AND SOCIAL OUTCOMES OF PRIMARY EDUCATION. Political support for primary education has never been higher in India. Yet the full private and social benefits of primary education are not widely understood. Broader public discussion of the outcomes of primary education, buttressed by additional research, could do much to foster broadly based social support in an era of increasing fiscal constraints.

IMPROVING ACCESS AND EFFICIENCY. With a basic system in place, attention should now turn to enrolling the 32 million primary-school-age children presently out of school and keeping those children in school for the full cycle. The key is to increase family demand for education and to improve school quality. Some reanalysis of the strategies in place to increase demand may be needed.

ENHANCING LEARNING ACHIEVEMENT. Raising the very low levels of learning achievement in rural schools is essential if children are to gain basic skills. This will require sustained attention to improving the quality of key inputs and of school management, including community participation.

REDUCING THE GAPS IN ENROLLMENT, RETENTION, AND ACHIEVEMENT. Equity objectives receive high priority in national policy, including education policy. Targeted strategies for girls and for scheduled caste and scheduled tribe children—-strategies based on research and carefully monitored—can help achieve these goals.

IMPROVING TEACHERS' PERFORMANCE. Improving the ability of teachers to function effectively in small rural schools with students of widely ranging ages is the central challenge in raising learning achievement. In-service training, stronger participation by community organizations and local governments, and more effective and efficient pre-service education for teachers are all promising approaches, although none is easy to implement.

IMPROVING THE QUALITY OF TEXTBOOKS AND THE EFFICIENCY OF THEIR PRODUCTION. Textbooks carry the curriculum and are the principal source of knowledge and instructional guidance for students and teachers alike. Having accomplished the massive task of providing textbooks to virtually all students, educational authorities now face the challenge of improving the quality of textbooks and the efficiency of their production.

BUILDING MANAGERIAL AND INSTITUTIONAL CAPACITY. Giving local communities responsibility for primary education and recognizing the importance of good school management for school performance place management of change squarely on the reform agenda. Developing management systems, and managers, for this new kind of work is a formidable task.

INCREASING FINANCING FOR PRIMARY EDUCATION. Although states finance by far the largest share of the costs of primary education, the central government is rapidly taking the lead in financing the investment costs of the reform program. Providing higher-quality primary schooling to all children will require additional resources, and both levels of government will face important financial challenges. In an era of fiscal stabilization, providing the resources for universal schooling will require both sustained political will and a better analytical understanding of the present—and possible—patterns of education finance.

The following chapters draw on a wide range of sources, including original analytical work by Indian researchers and others, to summarize what is known about each of these key challenges, to recommend directions and modifications for the reform program, and to identify important remaining gaps in our knowledge.

CHAPTER TWO

Economic and Social Outcomes as Justification for Investing in Primary Education

Over the past thirty years, much effort has been expended in quantifying the effect of education on social and economic development. The results clearly justify greater investment in education. Two findings are particularly important.

- Education leads to broad economic and social benefits for individuals and for society: higher productivity, lower infant and child mortality rates, and better health.

- These benefits are greatest once primary education broadly covers the population.

This chapter summarizes the evidence from India, showing the significant returns to basic education in that country and, more important, highlighting the costs of failing to move more rapidly toward universal coverage.[1]

Substantial benefits from universal schooling were perceived decades—in some cases, centuries—before the recent attempts to quantify them. Arguments for expanding education have been based on three main beliefs: that an educated population is more productive than an uneducated one, that literacy is essential for modern societies to function (and increasingly so in this era of rapid global integration), and that schools and the curriculum play an essential part in transmitting national—and in the case of India, state—cultures to all children and in furthering national and social integration.

In India the proponents of universal basic education go beyond arguments stressing its potential benefits for labor productivity and health status to give equal or greater importance to the wider social and cultural dimensions. The following discussion emphasizes the economic and social outcomes of education. Although it considers some issues for the education system as a whole, the focus is on primary education.

Economic Outcomes

The economic outcomes of education have been estimated using a range of techniques, including aggregate production functions, enterprise-based production functions, and rate-of-return analysis. All show positive returns to education in India. Aggregate production functions suggest that a one-year increase in the average education of the workforce can raise output 13 percent and that the increased educational level can contribute around one-quarter of the increase in economic output. Farm-based production functions show that in agriculture, education helps increase output, primarily by increasing the adoption of new technologies and farming practices. Rate-of-return analysis and earnings functions suggest that private and social returns to education can range up to 8–9 percent.

Rise in Aggregate Output

Recent measures of the economic outcomes of education have increasingly focused on the broad macroeconomic impact through estimates of aggregate production functions. These estimates attempt to capture the effects of mechanisms through which education raises the productivity of the entire workforce. Several cross-country studies have highlighted the significant impact of education, particularly primary education, on economic growth rates (Barro 1991; Lau and others 1993; Nehru and Dhareshwar 1994).

A study of particular relevance for India examined eight East Asian export-led economies (World Bank 1993).[2] Its results show that increasing enrollment in primary education—and later, secondary education—has been significant in explaining these economies' sustained high levels of growth. Since 1960 these economies have grown twice as fast as the rest of East Asia, three times as fast as Latin America, and faster than the industrial economies. Because this growth has been accompanied by equitable distribution of its benefits, poverty has fallen dramatically.

Macroeconomic models indicate that primary enrollment was the largest predicted contributor to economic growth rates over the past three decades in these economies, accounting for between 58 percent (Japan) and 87 percent (Thailand) of predicted growth. (Physical capital accumulation, the second most important factor, was responsible for between 35 and 49 percent of predicted growth.) Simply expanding enrollment is not enough of course. The quality of education also matters, as do efficient, flexible, and responsive labor markets.

In an attempt to overcome some of the inevitable data equivalence problems associated with such cross-national aggregate production function studies, Lau and others (1993) estimated a production function for a single country, Brazil, using longitudinal data from each of its states. They found that roughly a quarter of Brazil's economic growth rate in the 1970s (equal to 2.6 percent a year) could be attributed to the increase in the average education of the workforce and that one additional year of education for the workforce, on average, would increase real output about 20 percent.

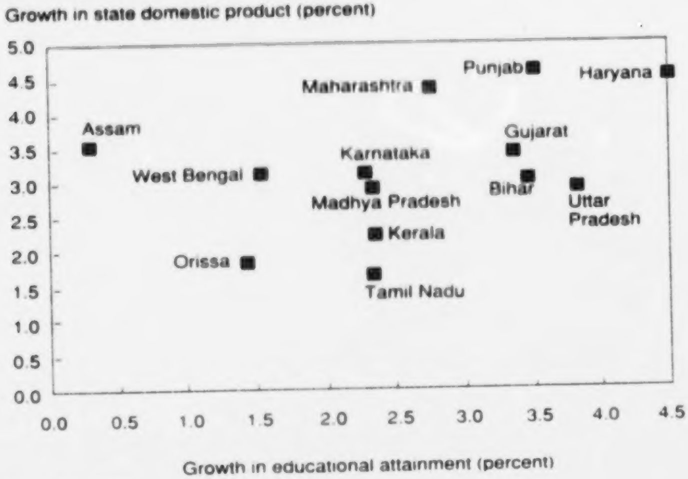
Loh (1995) replicated the methodology of the Brazil study for India, using data for the 14 most populated states. This essentially exploratory study is subject to the same criticisms that are directed to all production function studies, but its results are in line with those for other countries. The study estimated that for the period 1961–81 one additional year of education of the workforce, on average, was associated with a 15 percent increase in economic output. Dividing the period into two subperiods, 1961–71 and 1971–81, produced very different results, however. For the earlier period the association between education and output is not significant. This finding may be due to data measurement problems, but it might also result from distortions in the standard effects of capital, labor, and human capital inputs normally captured in the aggregate production function. These distortions stem from the planning and economic control exercised by the central and state governments during that period.

For 1971–81, however, the results are significant and striking. They show that increasing the average education of the workforce by one year would raise output 13 percent. The results also suggest that during the 1970s the increased schooling level of the labor force accounted for 27 percent of the predicted growth in output, while increases in primary schooling alone accounted for 20 percent. These findings are supported by the relation between the growth rates for average years of schooling of the workforce and state domestic product in each state (see figure 2.1).

The study's results suggest that while secondary and higher education should not be ignored, moving to universal basic education should be given high priority. In 1981 India's labor force had an average of 1.93 years of primary schooling. Only in Kerala was the average more than three years.[3]

Increased schooling, particularly primary schooling, brings increased output.

FIGURE 2.1 ANNUAL PERCENTAGE GROWTH IN EDUCATIONAL ATTAINMENT AND STATE DOMESTIC PRODUCT, SELECTED INDIAN STATES, 1971–81



Source: Loh 1995.

A. Mathur (1993) undertook a separate exercise relating stocks of human capital to levels of economic development. For 306 districts in 1971, Mathur correlated stocks of human capital ("pure" labor and by educational level) with an index of development.[4] The association was greater when comparisons used total human capital stocks rather than human capital stocks of the "productively employed," and the differences were largest for the "just literate" and for primary education, decreasing with higher levels of education. Mathur suggests that the differences correspond to the development outcomes from individuals not in the enumerated labor force (mainly women) and that these "externalities" are heavily concentrated among people who are literate and who have completed primary school. Mathur also found that the association between human capital and development is stronger at increasingly higher levels of education. Mathur concludes that although higher levels of education may have a greater direct impact on economic development, primary and middle schooling are important because they widely distribute the conditions conducive to development.

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The level of educational development influences poverty reduction as well as economic growth. Datt and Ravallion (1995) recently attempted to explain the uneven changes in rural living standards and poverty across Indian states between 1957 and 1991. Higher agricultural yields, lower inflation, and higher state spending on development programs raised living standards, but these factors only partially explain the differences among states. Initial conditions also mattered. States with better infrastructure and higher literacy levels at the beginning of the period had significantly higher long-term rates of both consumption growth and poverty reduction.

The relation between poverty and social deprivation, on the one hand, and educational attainment, on the other, is very strong in India, as the 1987–88 National Sample Survey results for Maharashtra show. Of the scheduled caste population above age 6, 53 percent of rural males were nonliterate, compared with 25 percent in other castes. For females the figures were 80 and 56 percent, respectively. Whether low incomes are seen as a cause or a consequence of low education, the association is strong. In the poorest 20 percent of rural households, 44 percent of males were nonliterate, compared with 15 percent in the richest 20 percent; the rates for females were 73 and 43 percent, respectively. In the poorest and richest urban households the illiteracy rates were 22 and 3 percent for males and 44 and 8 percent for females.

Rise in Farm Productivity

The evidence is strong that primary education plays a major part in fostering economic development and reducing poverty in India, as in other countries. The question is how.

Over the past fifteen years many increasingly sophisticated studies have looked at the effect of primary schooling on practices and productivity in agriculture, where most primary school graduates work. Focusing on high-productivity areas of the Punjab, Haryana, and Uttar Pradesh in 1961–72, Chaudhri (1979) argued that general education up to the secondary level has a significant effect on the diffusion of technology and the agricultural productivity of cultivators. He also argued that the wages of landless agricultural laborers are positively associated with their educational level. Nautiyal's (1989) detailed studies in Uttar Pradesh identified high correlations between educational level and both the adoption of improved farm practices and the yields of major crops. Rosenzweig (1990) compared the relation between the schooling levels and gross incomes of farmers in Integrated Agricultural Development Programme (IADP) districts, where the effects of the "green revolution" were expected to be very strong, with that in other districts. The contributions of schooling to gross income were higher at each schooling level among farm households in IADP districts than in non-IADP districts, but significantly so only for households with primary school education.

The most recent detailed studies of the effects of education on technical change in agriculture have been based on data collected from a national probability sample of more than 5,000 households in 1968–69, 1971–72, and 1981–82. Using data from the earlier two periods, Foster and Rosenzweig (1995) calculated that for every 1 rupee increase in profit due to the effects of exogenous technical change, households with primary schooling receive an additional 1.38 rupees (Rs). They found that schooling has a much greater effect than extension services in increasing farmers' profitability from high-yielding varieties of grain. They concluded, however, that high returns to schooling require an environment of technical change: "The returns to investment in technical change will in general be higher when primary schooling is accessible, and the returns to investment in schooling will be higher when technical change is more rapid" (p. 23).

Foster and Rosenzweig (1996) undertook an equally important analysis of the effect of a farmer's schooling on the profitability of neighboring farmers—an assessment of externalities. They concluded that information externalities are important in the early stages of the adoption of new technologies because farmers with low schooling benefit from the human capital of neighboring farmers with more schooling, who are the first to use the new seeds. Over a five-year period the profits of a farmer with no schooling were 4 percent higher if his neighbor had completed primary school than if he had not. Farmers with more-schooled neighbors also adopted new seeds earlier. Reviewing all the studies based on these data sets, Behrman, Rosenzweig, and Vashishtha (1994) concluded, "While the level of schooling had little effect on productivity in an area prior to technical change, it had independent and positive effects on subsequent growth in areas adopting new technology." Schooling produced externalities by helping to diffuse knowledge about new agricultural technologies to farmers with no schooling.

Together, these conclusions suggest that where the schooling of the farm population has not reached a certain threshold, the potential benefits of technical change in agriculture will not be fully realized, confirming earlier international studies (Lockheed, Jamison, and Lau 1980).

Positive but Low Rates of Returns

This section reviews the results of several analyses of the economic rates of return to schooling based on comparisons of education costs and differences in earnings by age and education (to reflect differences in labor productivity) in India. Unfortunately, none of these analyses is based on data more recent than

1978. Studies for other Asian countries are equally dated. Of the five full sets of social returns reported by Psacharopoulos (1994) for Asia, only one is based on data more recent than 1975.

An alternative approach to calculating returns is through the estimation of earnings functions, which attempt to isolate such factors as education and work experience to explain variations in earnings. For Asia such studies tend to be based on slightly more recent data than those used in the more elaborate rate-of-return studies. The results of eight of these, cited by Psacharopoulos, suggest that the average private rate of return to one additional year of education is 9.6 percent. Social returns would be lower. These studies tend not to differentiate between levels of education.

The most recent, and most sophisticated, comprehensive set of rates of return to education in India was estimated by Tilak (1987) based on special sample data (covering about a thousand individuals in rural and urban settings) for one district of Andhra Pradesh in 1977. Tilak calculated a range of returns on the basis of different sets of adjustments, including wastage (defined as grade repetition and dropout), economic growth, unemployment, labor force participation rates, and student ability (see table 2.1). The returns were higher in rural than in urban areas and were higher for women than for men.

Wastage in schools considerably reduces the returns to investment in education. The implication is that reducing wastage would produce substantial social returns, even if it required additional resources. When returns are adjusted only for wastage, those for primary and middle schooling are significantly greater than those for higher levels of education. With the full set of adjustments, however, the returns are generally lower (8–9 percent for the elementary cycle) and become similar for all the levels except secondary education, where they are negative. As in the several studies based on 1960s data, in Tilak's study the differences between social and private returns are relatively small, particularly with the full set of adjustments. Unadjusted rates were generally higher for women than for men, but once allowance was made for differences in labor force participation rates, the pattern was reversed. Returns were higher for scheduled than for nonscheduled castes at the primary level but lower for middle and secondary schooling.

The agricultural studies of Chaudhri and Nautiyal and the rate-of-return studies of Tilak point to differences in benefits by caste group. But the effect of education on earnings is nevertheless strong for all groups, and the unadjusted rates of return for primary schooling (though not for other levels) are reported to be higher for backward castes than for others. Mehta (1990) considered this issue further through a sample of 200 households in and around Lucknow in Uttar Pradesh. He reported that for members of both general and scheduled castes, earnings increased about 50 percent following completion of primary

TABLE 2.1 RATES OF RETURN TO EDUCATION, ANDHRA PRADESH, 1977
(percent)

	Assumption 1[a]		Assumption 2[b]	
Education level	*Private*	*Social*	*Private*	*Social*
Primary	15	13	8	7
Middle	19	15	9	6
Secondary	3	< 0	< 0	< 0
General degree	9	8	7	6

a. Adjusted only for wastage.
b. Adjusted for wastage, unemployment, nonparticipation in the labor force, and student ability.
Source: Tilak 1987.

schooling. For middle schooling, the increment over primary schooling was 41 percent for general castes and 64 percent for scheduled castes.

Acharya (1995) used data from the 1988 National Sample Survey for Maharashtra to investigate many aspects of women's behavior and experiences in the labor market. As one part of his analysis, he estimated earnings functions for women and men, using data covering 7,692 urban and 5,560 rural individuals. Rough calculations based on the coefficients indicate that the private returns are higher for urban areas than for rural, slightly higher for females than for males (except for rural primary schooling), and higher for primary schooling than for middle (except for rural females, for whom the returns at the two levels are similar; see table 2.2). The returns are not very different from the fully adjusted rates calculated by Tilak using data from the previous decade: 8 percent for primary schooling and 9 percent for middle (Tilak 1992).

Reconciling and Interpreting the Results

How can the rather low rates of return to primary schooling in India (particularly those based on earnings functions) be reconciled with the often higher results reported from other countries? Despite some claims that returns to primary education are invariably high across countries of Africa, Asia, and Latin America, there is growing skepticism. The work of such authors as Behrman and Birdsall (1985), Hinchliffe (1986), Knight and Sabot (1990), and Glewwe (1991) suggests that calculations have often incorporated upward biases. This has led Weale (1993) to argue that social returns to education will only rarely be in double digits. If that is the case, the results for India could be viewed as normal.

TABLE 2.2 PRIVATE RATES OF RETURN TO EDUCATION, MAHARASHTRA, 1988
(percent)

	Rural		Urban	
Educational level	*Male*	*Female*	*Male*	*Female*
Primary	5.5	4.5	8.0	8.3
Middle	3.5	4.5	5.9	7.0

Source: Acharya 1995.

Reconciliation of the low returns and the positive results of the studies focusing on broad macroeconomic change may lie in the conclusions of the agricultural productivity studies. First, returns are high where technical change is rapid and low where new technological opportunities are few. Parts of the Indian economy were operating in a context of rapid technological change during the 1980s, but some were not, possibly including the areas in Andhra Pradesh and Maharashtra from which the rate-of-return data came. Second, the externalities documented by the surveys are not caught by conventional rate-of-return studies, though they could have a strong effect on overall economic growth.

Consideration of externalities raises a further important issue. Both the Brazil study (Lau and others 1993) and the agricultural productivity studies in India (Foster and Rosenzweig 1995, 1996) emphasize the importance of a threshold average level of schooling across the community or labor force below which the effect of education will be muted.[5] More generally, based on cross-country analysis, Azariadis and Drazen (1990) suggest that there are increasing returns to scale for human capital investments when the quality of labor attains a critical mass or threshold level. Lau, Jamison, and Louat (1990) found some evidence for a threshold level of average education for the labor force of between three and four years. In India in 1981 the primary schooling of the labor force averaged less than three years in every state but Kerala and less than two years in six of the largest states.

The concept of a threshold suggests that the level of investment in education that is required before education has much effect on output may be high and the gestation period long. It also suggests that the benefits can be large and, because of the durability of human capital, persistent. For India it suggests that as long as the net primary enrollment ratio remains at around 70 percent (50–60 percent in the largest northern states), economic development will be constrained.

The concept of an average threshold of education raises another issue. What is the optimal distribution of this average education? Is it more effective for half the labor force to have six years of education and the other half to have two years or for everyone to have four years? Both the production function study and the agricultural impact studies for India suggest that the broader distribution is better. To explain why, Lau and others (1993) used the example of a telephone system in which the benefit to both the subscriber and the society increases with the total number of subscribers. Similarly, for education to have the maximum effect, an educated worker must have other educated workers with whom to interact. This argument is even stronger when it comes to the effect of literacy and education on social outcomes.

How long would it take to raise the average level of primary education to four years in India, given the current distribution of education? In 1971 the average for the labor force was 1.66 years and in 1981, the latest year for which data are available, 1.93 years. For 1992–93, according to the National Family Health Survey, the median for all males over age 6 was 4.8 years and for all females, zero (IIPS 1995). For illustrative purposes, it can optimistically be assumed that the average in 1990 was 2.4 years. If, starting in that year, all children entered primary school and completed five years, the primary schooling of the labor force would not average four years until around 2012. But because primary schooling has not yet become universal, this target will not be met until much later. In such states as Bihar, Rajasthan, and Uttar Pradesh the average level of schooling (1.51–1.68 years in 1981) is considerably less than the average across the country. In these states the average level of primary schooling would not reach four years until after 2020, even if universal schooling were to occur immediately.

Social Outcomes

Although the term *social rates of return* is commonly used, measures of the economic returns to education have been largely restricted to the productivity effects in wage and nonwage market activities. Over the past decade, however, a large body of international evidence has accumulated suggesting that education, particularly of girls, also results in higher productivity in a variety of other activities that increase household welfare. For example, the schooling of girls alters behavior in ways that, later in the girls' lives, reduce fertility and infant and child mortality rates, improve household health by influencing nutritional and health care practices, and improve their children's school performance. Several of the benefits from the behavioral changes accrue to society: for example, reductions in the incidence of communicable diseases. Primary education is particularly important in all this.

Improved Reproductive Health

Cross-country evidence that increased schooling is positively associated with reduced fertility is strong. Results from the World Fertility Survey in the early 1980s show that the effects were strongest in Latin America and the Middle East. They were also significant in Asia, where the total fertility rate averaged 5.81 for women with no education, 5.89 for those with one to three years of education, 5.66 for those with four to six years of education, and 3.70 for those with seven or more years of education (Cochrane and Farid 1984). Although a full primary education had a small impact on fertility (reducing the total fertility rate by 0.15), secondary schooling had the largest effect (reducing fertility by 2.96). Subbarao and Raney (1995) came to a similar conclusion in a more recent cross-national study.

In India the total fertility rate also falls with increasing education. According to the 1980 census, total fertility was 5.1 for women with no education, 4.5 for those with some primary education, 4.0 for those with upper primary education, 3.1 for those with secondary education, and 2.1 for those with higher education (India, Ministry of Human Resource Development, 1993a). A 1989 study in four districts of Gujarat State shows that the number of children ever born averaged 3.6 for mothers with no education, 3.3 for those with primary education, 3.0 for those with less than full secondary education, and 2.4 for those with secondary education (adjusted for the mother's age; see Visaria 1993).

These studies again suggest that reductions in fertility are greatest for women who complete a secondary education. But the recently published results of the 1992–93 National Family Health Survey for all major states, which provides more detail than was previously available, confirm the strong effects of primary schooling. For example, survey data for Uttar Pradesh and Tamil Nadu show a striking relation between illiteracy and both the total fertility rate and the crude birth rate: Uttar Pradesh, with a higher illiteracy rate among females in the households sampled, also has higher total fertility and crude birth rates (see table 2.3). Equally strong is the relationship between both the total and desired fertility rate and the level of women's education within each state (figure 2.2).

Although these comparisons do not take into account the effects of intervening factors associated with higher levels of education—such as higher income—the relation between educational level and both desired and actual fertility rates appears robust. The effect of literacy and some elementary education is particularly evident. But stronger than the effect of successive levels of education for women within a state is the effect of the average level of education in that state. In Uttar Pradesh, although the fertility rate for women with at least a secondary education is half that for nonliterate women, it is still higher

TABLE 2.3 LITERACY, TOTAL FERTILITY RATE, AND CRUDE BIRTH RATE, TAMIL NADU AND UTTAR PRADESH, 1992–93

State	*Literacy (percent)*	*Total fertility rate (live births per 1,000 women ages 15–49)*	*Crude birth rate (live births per 1,000 population)*
Tamil Nadu	56	2.2	20.7
Uttar Pradesh	31	5.1	36.2

Source: IIPS 1995; state reports.

than the rate for women who have not completed even an elementary education in Tamil Nadu, where the average educational level is higher.

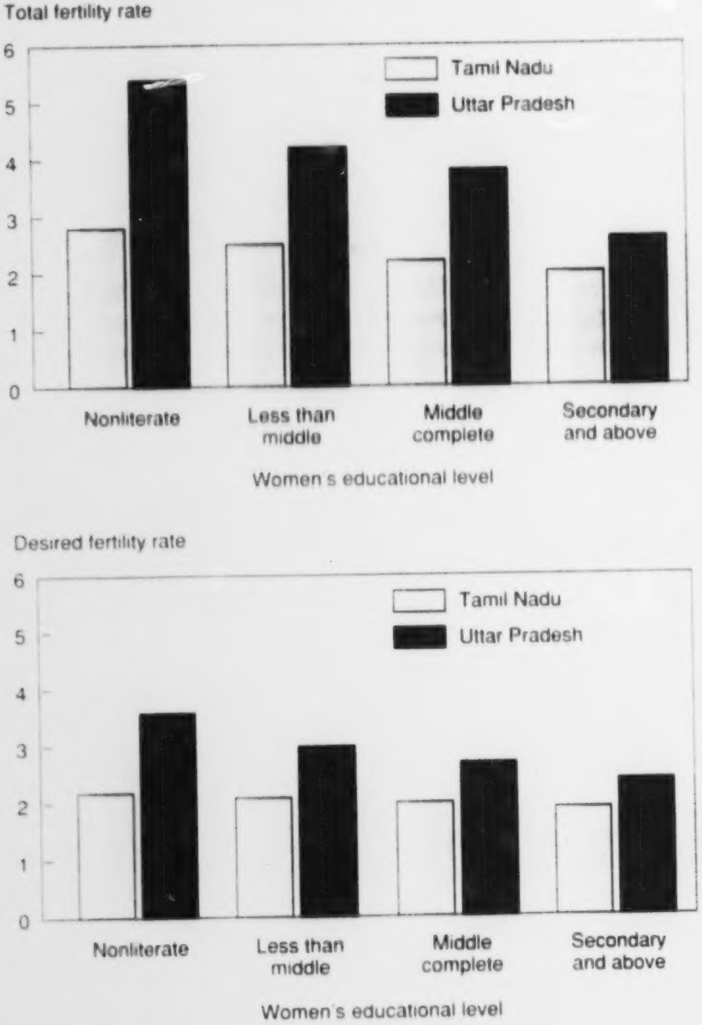
This finding is in line with Caldwell's (1980) argument, based on data for south India (and elaborated by Hinchliffe 1986), that it is the proportion of the community receiving some education, rather than the average duration of schooling of those who have attended school, that chiefly determines when a society undergoes a fertility transition. Such arguments strongly support the provision of mass primary education. They also call into question the efficiency of the educational structures in the many Indian states that have relatively high secondary enrollment ratios but far less than universal primary and middle school completion rates.

The determinants of differences in fertility rates are complex and not fully understood (Hobcraft 1993). One intervening factor is probably women's age at first marriage, which is related to level of education in both Uttar Pradesh and Tamil Nadu (see table 2.4). Again, although the age of marriage increases with level of education in both states, in Uttar Pradesh the age of marriage for women who have completed elementary education is lower than that for nonliterate women in Tamil Nadu.

Another intervening factor is the use of modern methods of birth control. According to the results of the 1986–87 National Sample Survey, 33.9 percent of rural couples in which the wife had received a full primary education used contraception (including sterilization), compared with 21.3 percent of couples in which the wife was nonliterate. For couples in which the wife had completed secondary schooling, the coverage was only marginally higher, at 33.4 percent. More recently, Basu (1992) showed that, among a sample of urban women, 28 percent of those with some education had ever used modern contraceptive methods (excluding sterilization), compared with 8 percent of those with no education. The National Family Health Surveys provide more information (see figure 2.3).

Fertility rates fall as women receive more schooling.

FIGURE 2.2 TOTAL AND DESIRED FERTILITY RATE, BY WOMEN'S EDUCATIONAL LEVEL, TAMIL NADU AND UTTAR PRADESH, 1995



Source: IIPS 1995, state reports.

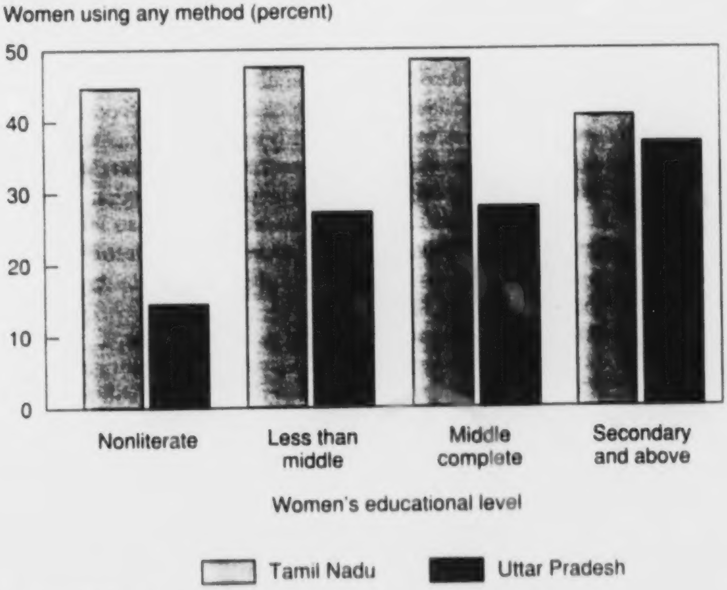
TABLE 2.4 WOMEN'S AVERAGE AGE AT FIRST MARRIAGE, TAMIL NADU AND UTTAR PRADESH, 1992–93
(years)

State	*Nonliterate*	*Less than middle*	*Middle*	*Secondary and above*
Tamil Nadu	17.5	18.2	19.3	22.1
Uttar Pradesh	14.8	16.5	17.4	20.5

Note: Includes women between 25 and 29 years of age.
Source: IIPS 1995; state reports.

Women's use of birth control rises with educational level.

FIGURE 2.3 WOMEN'S USE OF BIRTH CONTROL, BY EDUCATIONAL LEVEL, TAMIL NADU AND UTTAR PRADESH, 1995



Source: IIPS 1995; state reports.

In Uttar Pradesh women's use of birth control increases dramatically with educational level. In Tamil Nadu, however, contraceptive use even among nonliterate women is higher than it is for all groups in Uttar Pradesh. Once coverage is around 40 percent, educational level appears to have no further effect. In both states sterilization (mainly of women) is the main form of birth control, but the use of temporary methods of birth control increases significantly with women's level of education.

When fertility rates fall, private benefits accrue to parents and also to their children (particularly boys, according to Jeejeebhoy 1993): when there are fewer children in a family, children receive higher investments in the form of schooling and parents' time. Lower fertility rates are also generally regarded as economically beneficial to society in countries, such as India, that have high rates of population growth. Benefits result from the effect on public and private savings rates, from higher returns to investments in the quality of human capital, and from women's increased labor force participation. Through these effects, investment in schooling produces benefits to society beyond those captured by individuals. The results of the National Family Health Surveys suggest that these societywide benefits will be greatest when education reaches a particular threshold across the community (rather than a threshold for the individual). Behavioral changes resulting from enough education of enough people influence others with less education.

Declining fertility rates also change the required amount and distribution of resources for education. Consider Southeast Asia, where in 1965 primary school enrollments in most countries were significantly higher than would be expected on the basis of per capita income (Behrman and Schneider 1994; World Bank 1993). During the following 25 years the share in the population of children below the age of 15 fell significantly, for instance, from 43 to 26 percent in Korea and from 46 to 34 percent in Thailand. During the 1980s the growth rate of the age group 6–11 was very low, and in many countries in the region the absolute number in this group fell.

With declining or slowly growing school-age populations, a country can increase spending to provide more years of education or better-quality education. Or it can reduce spending as a proportion of GDP while still maintaining current enrollment ratios and standards. If Korea's school-age population had been as large a share of the total population in 1988 as Kenya's, the Korean government would have had to spend 5.6 percent of GDP on basic education to achieve its high enrollment ratio, rather than the 2.8 percent it actually spent. Conversely, if Pakistan's school-age population had grown at the low rate that Korea's did over the past 25 or so years, the government could have increased enrollment rates by 50 percent for the same level of spending. These figures suggest the very large financial savings that accrue from reductions in the birth rate.

India's total population in 1991 was 846 million, of whom 303 million (35.8 percent) were in the age group 0–14 (World Bank 1993). Current projections suggest that by 2025, the share of this age group in the population will have fallen to 23.9 percent (World Bank 1993, table 26). Nevertheless, the number in this age group will increase (to 326 million), and for the near future the school-age group will continue to grow. The age group 6–13 numbered 163 million in 1990 and is projected to reach 171 million by 2000 (see appendix C, tables C.4 and C.5). Further reductions in fertility will be required just to stabilize the size of the elementary-school-age group.

Better Child Health

Schooling also has a strong effect on behavior in health care, particularly child health. Cross-country studies have shown that, even after adjusting for economic factors, mothers' schooling of one to three years is associated with a 20 percent fall in the risk of childhood death and that this effect increases with further educational attainment.

Analyzing 1981 census data on child mortality by state in India, Bourne and Walker (1991) found a strong relation between mothers' education and various measures of child mortality. Interestingly, they suggest that mothers' education has an even greater effect on the survival of daughters than on that of sons. In northern India mothers with a secondary education experienced 77 per thousand fewer deaths among sons under age 5 and 96 per thousand fewer deaths among daughters under 5 than mothers who were nonliterate. Basu's (1992) study of urban women suggests child mortality rates of 82 per thousand for mothers with no schooling and 34 per thousand for those with some schooling. Again, the determinants of these associations are not clear. But Dasgupta's (1990) study of 1,800 women in Punjab in 1984 led her to conclude that schooling improves a mother's basic child-care skills, domestic management of ill health, efforts at preventive care, and use of modern medical services.

The National Sample Survey data for 1986–87 show that the share of rural mothers registered for postnatal care increased with schooling level, from 9.1 percent for nonliterates to 20.5 percent for primary school graduates to 23.7 percent for those with secondary schooling and above. Immunization rates (triple antigen) also increased with mothers' schooling level, from 10.6 to 28.1 to 34.9 percent. Basu's study corroborates these data: 22.7 percent of children of urban mothers with some schooling were vaccinated, compared with just 7 percent for those with none. The 1992–93 National Family Health Survey again provides the most complete and recent evidence on these issues (see figure 2.4).

The pattern of results is similar to that for changes in fertility. Within states, infant and child mortality rates are lower for mothers with higher levels of

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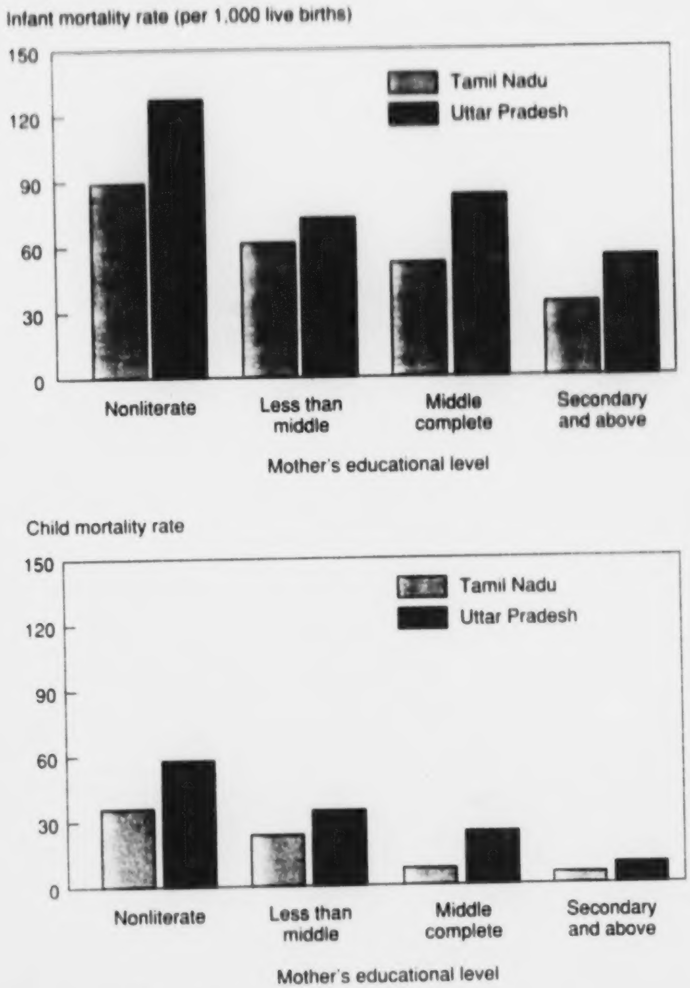
Mothers' education has a dramatic effect on child survival.

FIGURE 2.4 INFANT AND CHILD MORTALITY, BY MOTHER'S EDUCATIONAL LEVEL, TAMIL NADU AND UTTAR PRADESH, 1995



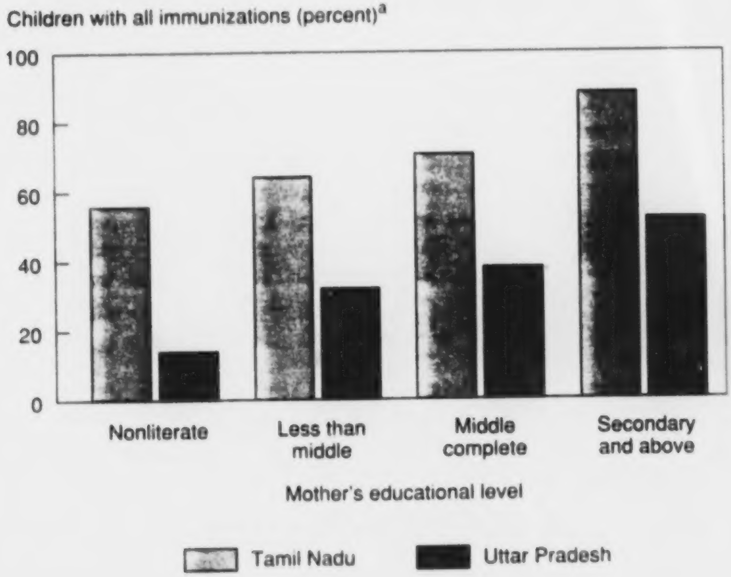
Source: IIPS 1995; state reports.

education. And at each level of mothers' education infant and child mortality rates are lower in Tamil Nadu than in Uttar Pradesh, again suggesting a general threshold effect of schooling.[6]

Child mortality rates are probably influenced by the prevalence of immunization. Again, this varies both between and within states (see figure 2.5). In both states the probability of immunization increases significantly with mothers' education. But the child of a nonliterate mother in Tamil Nadu is still more likely to be immunized than the child of a mother with a secondary school education in Uttar Pradesh, again confirming the gains from mass schooling.

The likelihood that a child will be immunized increases with mother's schooling.

FIGURE 2.5 CHILD IMMUNIZATION, BY MOTHER'S EDUCATIONAL LEVEL, TAMIL NADU AND UTTAR PRADESH, 1995



a. Children below the age of 23 months who received the full Extended Programme of Immunization (covering five diseases).

Source: IIPS 1995; state reports.

The lower rates of illness and death among infants and children that are associated with mothers' education mean less suffering and greater physical strength for surviving children. They also reduce the time that women stay out of the labor force to treat child illness or for compensatory childbirth. Women's increased labor force participation brings both private and social gains through higher output.

Better Nutrition

Mothers' schooling also influences children's nutritional status. Sen and Sengupta's (1983) study of two villages in West Bengal showed that children of literate mothers had higher nutritional intakes than children of nonliterate mothers. The difference was particularly large for boys. The National Family Health Survey's measures of weight-for-age show that the likelihood that a child will be severely undernourished declines with rising mother's educational level in both Uttar Pradesh and Tamil Nadu (see figure 2.6). Although the children of more educated mothers are more likely to be better nourished, the differences are small except for the group of mothers who have completed secondary education. Similarly, the differences between the states, though evident, are smaller than those in the comparisons for fertility behavior and infant and child mortality and morbidity.

There is substantial evidence that healthy and well-nourished children use educational inputs more productively (see Moock and Leslie 1986, for Nepal). Protein-energy malnutrition, temporary hunger, and micronutrient deprivation all adversely affect learning achievement (Lockheed and Verspoor 1991). Moreover, persistent illnesses that foster repeated absence from school and heavy parasite loads (contributing to malnutrition and absence) impair learning.

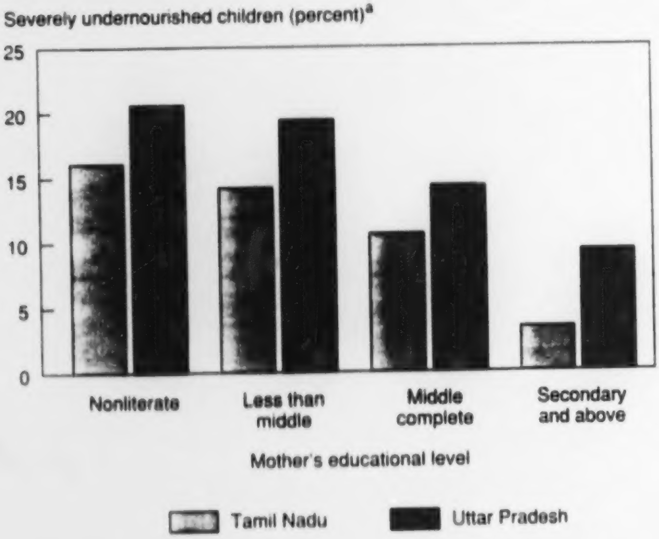
Easier Route to Universal Schooling

The data presented on the relation between schooling and fertility and child mortality are largely at the level of the individual. As indicated, however, these variables also differ among states. While India's total population increased 23.5 percent between 1981 and 1991, among states the growth ranged from 14.0 to 28.1 percent, with the average annual exponential rate of growth ranging from 1.3 to 2.5 percent. Total fertility rates in 1991 ranged from 1.8 in Kerala to 5.1 in Uttar Pradesh. One consequence of these differences is wide variation in the proportion of young children (ages 0–6 years) in the population (see table 2.5).

In states where the proportion of children is relatively high, more strain is placed on the rest of the population to develop the resources to care for them.

Children of more-educated mothers are more likely to be better nourished.

FIGURE 2.6 UNDERNOURISHED CHILDREN, BY MOTHER'S EDUCATIONAL LEVEL, TAMIL NADU AND UTTAR PRADESH, 1995



a. Children whose weight-for-age is 3 standard deviations below the World Health Organization international reference population.

Source: IIPS 1995; state reports.

States with high schooling levels and low fertility levels face different education expenditure needs than those with low schooling levels and high fertility levels. For example, to achieve universal primary education by 2005, Uttar Pradesh would have to almost double its enrollment (and significantly increase expenditure), while Kerala could do so even while reducing the number of school places (see box 2.1).

Finally, data on fertility, contraceptive use, and infant mortality (appendix C, table C.1) are correlated with the 1991 measure of female literacy. Higher female literacy is significantly correlated with lower fertility, greater contraceptive use, and lower infant mortality (see table 2.6). Kerala, with 87 percent female literacy, is in a class of its own. The state's high literacy rate and low

TABLE 2.5 PROPORTION OF YOUNG CHILDREN IN THE POPULATION OF SELECTED INDIAN STATES, 1991
(percent)

State	*Children ages 0–6*
Andhra Pradesh	16.5
Bihar	20.6
Gujarat	16.5
Kerala	13.2
Madhya Pradesh	19.8
Tamil Nadu	13.3
Rajasthan	20.1
Uttar Pradesh	20.3

Source: Nanda 1992

population growth are already resulting in falling primary enrollment, while universal schooling is maintained. In the medium term such states as Maharashtra, Punjab, and Tamil Nadu, with about 50 percent female literacy, can envisage a similar situation. But Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh, with less than 30 percent female literacy, will continue to have low enrollment rates even if absolute enrollments grow.

This discussion has emphasized the important social development effects that a broader base of primary education can have in states with low coverage. But the comparisons of these states with those in which educational development is more advanced, such as Tamil Nadu, should not be taken to imply that the second group has reached optimum coverage or quality. Even at the primary level, further gains are needed in these states.

Conclusions

Two overall conclusions can be drawn from this survey of the economic and social outcomes of education. First, the economic and social benefits of education are greatest when a critical minimum level of educational attainment has been achieved across the population. Mass expansion of primary education that raises India's currently low educational attainment (averaging about 1.9 years for workers in 1981) to a threshold of about four to five years of completed primary education per worker could have high payoffs in economic and social benefits. To realize these benefits in the medium term, all states will need to

BOX 2.1 THE EFFECT OF BIRTH RATES ON EDUCATION NEEDS

Higher levels of educational development are strongly correlated with lower birth rates. And lower birth rates make the task of educational development easier, for two reasons: the number of additional children born each year declines, and the backlog of school places needed is smaller. The effect of birth rates on the growth in enrollment required to achieve universal schooling can be dramatic, as Kerala (1990 birth rate of 19.6 per thousand) and Uttar Pradesh (1990 birth rate of 35.6 per thousand) demonstrate.

In Kerala the age group 6–10 is expected to decline 18.9 percent between 1990 and 2005, while in Uttar Pradesh it is expected to increase 30.7 percent. Kerala and Uttar Pradesh differ in their current educational coverage of this age group. Primary education in Kerala is virtually universal. To maintain universal schooling will therefore require 457,000 fewer places in 2005 than in 1997. In Uttar Pradesh in 1993 the gross enrollment rate was 69 percent, and 13 million primary school places existed. To achieve universal schooling in 2005, around 24 million children would need to be enrolled.

Thus, to ensure universal enrollment by 2005, Kerala could reduce the number of school places, while Uttar Pradesh would need to almost double them. The differences in the financial implications of this scenario for the two states are substantial.

PROJECTED SIZE OF AGE GROUP 6–10 IN KERALA AND UTTAR PRADESH, 1990–2005 (thousands)

Year	*Kerala*	*Uttar Pradesh*
1990	2,925	18,356
1995	2,830	19,611
2000	2,526	21,502
2005	2,373	23,980

Source: World Bank staff projections based on 1991 census data; appendix C, table C.4.

develop a solid foundation of education. And second, the benefits of education extend beyond individuals who receive schooling directly. Other members of society also gain, through externalities. The resulting improvements in economic efficiency provide continuing justification for public sector involvement in education. Primary schooling offers the greatest economic and social returns, followed by secondary schooling.

On economic outcomes, the survey leads to five conclusions. First, the average educational attainment of the population has a strong positive effect on economic growth. An exploratory production function analysis suggests that for 1971–81 each one-year increase in the average schooling of the labor force was associated with an increase in output of 13 percent. Second, in agriculture, primary schooling affects productivity, speeds the adoption of green revolution technologies, and accelerates growth where there are new technological oppor-

TABLE 2.6 SELECTED SOCIAL AND DEMOGRAPHIC INDICATORS, 15 MAJOR INDIAN STATES, 1992–93

State	*Total fertility rate (live births) per 1,000 women ages 15–49*	*Crude birth rate (live births per 1,000 population)*	*Couples using contraception (percent)*	*Infant mortality (deaths per 1,000 live births)*
Andhra Pradesh	2.6	24.2	47	70.4
Assam	3.5	30.4	43	88.7
Bihar	4.0	32.1	23	89.2
Gujarat	3.0	27.2	49	68.7
Haryana	4.0	32.9	50	73.3
Karnataka	2.9	25.9	49	65.4
Kerala	2.0	19.6	63	23.8
Madhya Pradesh	3.9	31.6	37	85.2
Maharashtra	2.9	26.3	54	50.5
Orissa	2.9	26.5	36	112.1
Punjab	2.9	25.0	59	53.7
Rajasthan	3.6	27.0	32	72.6
Tamil Nadu	2.5	23.5	50	67.7
Uttar Pradesh	4.8	35.0	20	99.9
West Bengal	2.9	25.5	57	75.3
Coefficient of correlation with female literacy	–0.74	–0.71	0.83	–0.78

— Not available.

Source: IIPS 1995; calculation of correlations, World Bank staff.

tunities. Third, schooling also produces externalities by helping to diffuse knowledge about new agricultural technologies to unschooled farmers. Fourth, in areas where schooling across the farm population has reached a certain threshold, the potential effects of an advance in agricultural technology are more fully realized. Fifth, private and social market returns are highest for primary and middle schooling, and returns to primary schooling are highest for lower-caste graduates. But two caveats should be kept in mind: except for one study based on 1988 data, no rate-of-return or earnings functions studies have used data more recent than 1978, and the results are very sensitive to dropout rates.[7]

With respect to the social (or nonmarket) outcomes of education, the National Family Health Surveys show strong overall relations between educational levels, fertility and infant and child mortality rates, and the nutritional status of children. Primary schooling appears to have a stronger effect on fertility rates than previously thought. Two types of effect are discernible. First, within each state, there is a clear inverse relation between the level of schooling and both the desired and the actual fertility rate. Second, in states with higher schooling levels, fertility rates are lower at each level of schooling than in states with lower schooling levels.

Education also brings actual fertility levels closer to desired levels, which benefits parents. Lower levels of fertility are also generally judged to have social benefits, particularly in countries, such as India, that have high rates of population growth. A demographic transition from high to medium—or from high to low—population growth is widely viewed as important in raising living standards. Expanding primary and secondary schooling could bring about such a demographic transition in India.

Mother's education reduces infant and child mortality, and even a few years of schooling have a positive effect. Here again, there appears to be a wider societal effect that is dependent on a critical threshold of schooling across the population.

These social outcomes have many spillover effects. Lower population growth rates substantially reduce the financing required to achieve and maintain universal primary schooling. Lower child mortality rates reduce suffering, increase female labor force participation rates, and probably play a part in the process through which parents come to desire fewer but healthier children. Healthier, better-fed children tend to achieve more while in school and to become more productive adults. All these outcomes appear to be closely linked to the level of mothers' education.

What are the implications of these conclusions for governments in India? Do the positive economic and social returns of primary schooling to individuals and their families justify government financing and provision of schooling? Conversely, should the expansion of schooling be limited to that for which individuals and their parents are willing to pay? If parents perceive the benefits of primary schooling as insufficient to justify the costs of enrolling their children in school or allowing them to complete the primary cycle, should governments be concerned, and should they attempt to alter the balance by reducing the costs?

Two sets of considerations support sharing the costs between parents and the government.[8] The first centers on economic efficiency. If individuals bore all the costs and based their decision on whether to invest in primary schooling on a comparison of costs with expected private benefits, aggregate private "purchases" would be below the socially optimal level because benefits also would accrue to others. The benefits generated when unschooled farmers, following the example of schooled neighbors, adopt green revolution technologies, for example, would justify higher aggregate investments in schooling than those made on the basis of individual cost-benefit considerations. So would the benefits generated when the fertility and health practices of schooled women influence the behavior of unschooled women.

The second set of considerations supporting government subsidy of schooling centers on social equity. If credit markets and information were perfect, even the poorest parents might borrow to finance all the costs of their children's schooling. But credit markets and information are never perfect, and the risks of not obtaining the expected benefits are large. Requiring parents to bear the entire cost of schooling would reduce access to education for much of the population in a country such as India, leading to losses in both equity and efficiency.

There is a another consideration. The benefits of schooling accrue largely to the child and to his or her future spouse and children. Although sons may have some financial obligation to their parents, in much of Indian society the benefits from daughters' schooling accrue not to their parents but to their husband's parents. For these reasons, parental investments in schooling children of both sexes, but particularly girls, will be below the socially optimal level if investment decisions are based only on perceptions of private costs and benefits.

The theoretical argument for having governments share the costs of primary schooling is compelling. The situation in India, where millions of children are never enrolled in school and millions more are withdrawn before completing even five years, shows that even with "free" schooling, many parents still view the costs as higher than the benefits. Government financial support is clearly required to enable poor children to attend school and to generate all the potential private and social benefits. Whether governments should directly provide schooling, as well as finance it, is a separate issue. Several considerations relating to this issue are discussed in later chapters.

Analyses of the economic and social effect of primary education in India and in other countries suggest two conclusions. First, the spread of primary education in India has boosted growth in output, reduced fertility and infant and child mortality rates, and improved the health of the population. Second, constraints on the expansion of enrollment have limited those effects, particularly for the poor. Unless the proportion of children who complete a basic education increases significantly, the poor will not gain from the economic changes occurring in India. Nor will the rest of the population benefit fully from changes in economic policy and increased investment in physical infrastructure. Raising the average educational level of the labor force and the population to the point at which the effects are greatest for each additional rupee invested will take time. The greater the delay in reaching this threshold, the greater the loss for the entire population.

CHAPTER THREE

Improving Access and Efficiency

Enrollment data and age-specific literacy rates suggest that India has made much progress in expanding access to education: in 1993 about 100 million children were enrolled in primary school, up from 85 million in 1987. Nevertheless, irregular school attendance, high primary school dropout rates, and overage enrollment mean that many fewer children complete the primary school cycle than are enrolled. About 32 million of the 105 million children ages 6–10 years were out of school in 1993.[1]

Enabling all children to complete primary education of good quality is a central goal of Indian education policy. The speed with which it can be achieved will be determined by the success of the central, state, and local governments in creating an accessible infrastructure for schooling, enhancing the demand for schooling, and increasing the efficiency of student flows.[2] Supply-side interventions will focus on building enough schools and classrooms and hiring and deploying enough teachers. Sustained demand-side interventions will address improving the quality of schooling, enforcing compulsory attendance laws, implementing automatic promotion of students from one grade to the next, and offsetting the cost of children's labor. Short-term demand-generation activities, already used in many states, can be effective in raising enrollments.

The challenges of educational development in India can only be understood against the background of the great diversity in educational and socioeconomic contexts among the states. Three-quarters of children who are out of school live in six states—Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan,

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Uttar Pradesh, and West Bengal—most of them probably in districts with low female literacy. The financial burden of providing good-quality education to all children will therefore fall disproportionately on these six states and on these districts. Moreover, many of the children who are out of school live in remote areas in these and other states, belong to hard-to-reach groups, or have special educational needs (these issues are discussed further in chapter 5). To do justice to this diversity, this chapter, wherever possible, presents data for the 15 major states, which contain more than 95 percent of the Indian population.

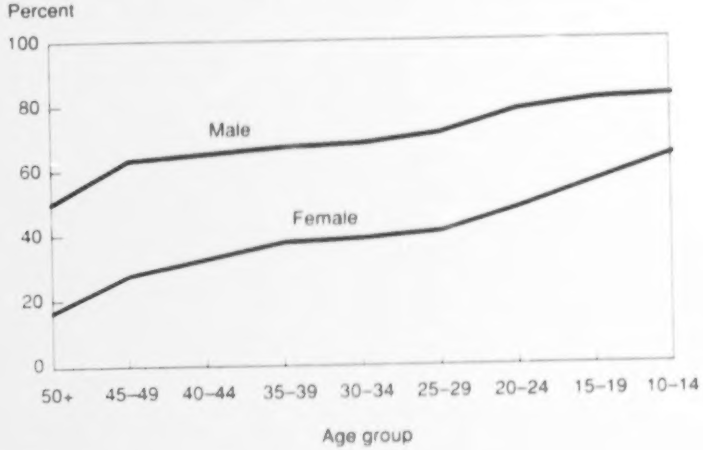
Growing Access to Primary Education

The strongest indication of the success of the Indian education system is the tremendous rise in literacy rates, not only for the population as a whole but also for younger age cohorts. Literacy is a major outcome of primary school participation (although it can also be attained through nonformal education and literacy campaigns).

Age-specific data on literacy from the 1992–93 National Family Health Survey (NFHS) indicate that much progress has been made in educational coverage (see figure 3.1).[1] Although only 17 percent of women ages 50 and above

Literacy is rising rapidly but is still too low.

FIGURE 3.1 LITERACY, BY GENDER AND AGE GROUP, INDIA, 1995



Source: IIPS 1995.

(the oldest age cohort for which data were reported) were literate, the literacy rate for women educated 10 years later (ages 40–44) was nearly twice as high (33 percent), and the literacy rate for those eligible to enter school in the late 1980s (ages 10–14) doubled again to almost 66 percent. NFHS data also show that the literacy gap between males and females has narrowed from 33 percentage points for the age group 50 and above to 18 percentage points for those ages 10–14.

Despite this progress, illiteracy remains unacceptably high even in younger age groups: 36 percent for girls ages 10–14, 44 percent for girls ages 15–19, and 18 and 20 percent for boys in these age groups. NFHS data also show that more than half of the girls and more than a quarter of the boys in the age group 15–19 had not completed primary school, providing further evidence of persistent gaps in the provision of primary schooling.

All direct indicators of the percentage of school-age children who participate in primary school have increased since 1986, but estimates vary considerably by indicator and data source (see figure 3.2). For example, estimates of net and gross enrollment rates for 1993 range from a rate of 68 percent "in school" for children ages 6–10 (IIPS 1993) to 105 percent for the primary gross enrollment rate (India, Ministry of Human Resource Development, 1994c).[4] Increases from 1986 to 1993 range from 4 to 9 percentage points. For reasons detailed in the technical note to this chapter, this book uses enrollment data from the Sixth All-India Education Survey provisional statistics (NCERT 1995) and estimates of primary school population cohorts (ages 6–10) based on the 1991 census and smoothed age-sex data from the 1993 NFHS (IIPS 1995) and the 1991 and 1992 Sample Reporting Survey.[5]

Low Attendance

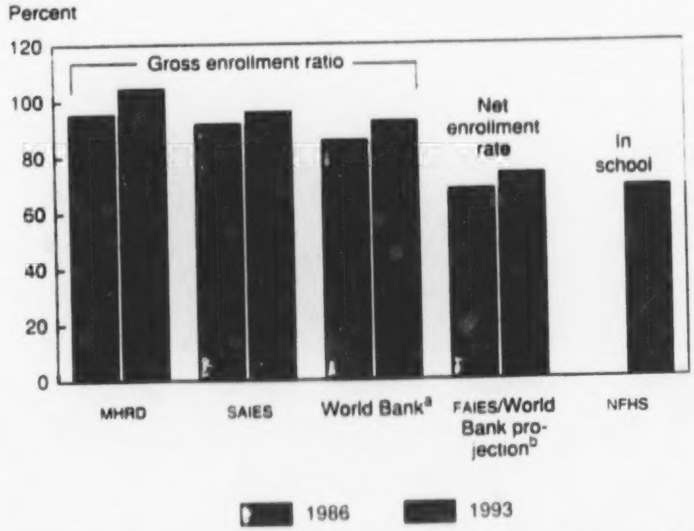
How many primary-school-age children do not attend school? To answer this question, information is required about how many primary-school-age children there are and how many of them are in school.

Children Ages 6–10

Estimates based on the 1991 census and data on age structure from the 1991 and 1992 Sample Reporting Surveys and the 1992–93 NFHS suggest a primary-school-age cohort (6–10 years) of 105.8 million in 1993 (see appendix C, table C.4). This was 6.1 million more than projected on the basis of the 1981 census (India, Ministry of Human Resource Development, 1994c) and 3.9 million more than the estimate used in the 1993 Sixth All-India Education Survey (NCERT 1995). For 1995 the number was 106.2 million, almost within 1 percent of estimates recently released by the government of India (104.8 million).

All sources show that primary school enrollment is rising but that starting points differ.

FIGURE 3.2 PARTICIPATION IN PRIMARY SCHOOL, BY SOURCE OF ESTIMATE, INDIA, 1986 AND 1993



Note: MHRD, Ministry of Human Resource Development; SAIES, Sixth All-India Education Survey (NCERT 1995); FAIES, Fifth All-India Education Survey (NCERT 1992b); and NFHS, National Family Health Survey.

a. Estimates based on World Bank population estimates and enrollments from the Sixth All-India Education Survey.

b. For 1986, FAIES; for 1993, World Bank estimate based on projection of net enrollments, assuming net enrollment rates grew at the same rate as gross enrollment rates in 1986–93.

Source: India, Ministry of Human Resource Development, 1994c; NCERT 1992b, 1995; World Bank population estimates; IIPS 1995.

Children Ages 6–10 in School

How many primary-school-age children go to school? This question is difficult to answer for three reasons. First, contemporary data on enrollments by age are not available. Second, enrollment figures do not distinguish between children in the relevant age group and students who are overage or underage. Third, most recent data do not distinguish between children who appear on school rosters and those who actually come to school. Estimates can be made, however, from survey data and adjusted enrollment figures.

From all sources, it appears that in the mid-1990s about three-quarters of the children ages 6–10 were enrolled in grades 1–5. The 1986 Fifth All-India Education Survey reported a total of 68.2 million children ages 6–10 enrolled in grades 1–5 (NCERT 1992b); 1991 census figures back-estimated to 1986 show an age cohort of 100.3 million children (appendix C, table C.4), for a net enrollment rate of 68 percent. Age-specific enrollment data from the 1993 Sixth All-India Education Survey are not yet available, but if the net enrollment rate in 1993 was the same as that in 1987, 71.8 million children ages 6–10 would have been enrolled. If the net enrollment rate grew at the same rate as the gross enrollment rate for the period, it would have increased to 73 percent, for a total enrollment of 77.6 million children ages 6–10.[6] This figure is approximately the same as that calculated by Mehta (1995a), using 1987 data from the National Sample Survey and 1981 census data, for a 1993–94 net enrollment rate of about 80 percent (88 percent for boys and 71 percent for girls). Adjusting Mehta's figures for the 3 percent of children ages 6–10 who are enrolled in grades 6–9 (according to the FAIES) gives a primary net enrollment rate closer to 75 percent. The rate is undoubtedly lower in rural areas. For example, on the basis of National Sample Survey data for 1987, Drèze and Sen (1995) estimated that in rural areas 51 percent of girls and 26 percent of boys ages 12–14 had never enrolled in school.

The difference between the total number of children enrolled and the number of children ages 6–10 enrolled is due to the large number of overage students who are enrolled. Recent data on enrollment patterns in rural low-literacy districts in eight states indicate that students who are overage because they entered late or have repeated one or more years of school constitute a substantial share of reported enrollments. Data on the age distribution of students in the fourth or fifth grade from the 1993 DPEP surveys in low-literacy rural districts show that from 22 percent (Madhya Pradesh) to 87 percent (Tamil Nadu) of students are the normal age for grade and that as many as 78 percent (Madhya Pradesh) are overage (see table 3.1).[7] These data are from educationally disadvantaged districts, however, and cannot be generalized to all of India or even to all rural districts. Moreover, they are available for only two grades.

Further evidence of the high incidence of overage students comes from a 1992 survey of 16,000 schools in 32 states and union territories, which found that 21 percent of boys and 19 percent of girls enrolled in grade 5 were overage (Kapoor and others 1994). The large number of overage students may be a positive sign that literacy campaigns, enrollment drives, and other factors have caused an upsurge in parental demand and that schools are responding by accepting children outside the designated age range for grade.

TABLE 3.1 AGE DISTRIBUTION OF GRADE 4 AND 5 STUDENTS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993
(percent)

State (and grade)	*Age 8*	*Age 9*	*Age 10*	*Age 11*	*Age 12+*
Assam (grade 4)	1	19	52[a]	17	11
Haryana (grade 5)	1	3	26[a]	33	37
Karnataka (grade 4)	1	32[a]	53	10	4
Kerala (grade 4)	9	57[a]	27	5	2
Madhya Pradesh (grade 5)	0	2[a]	20	41	37
Maharashtra (grade 4)	5	34[a]	37	16	8
Orissa (grade 5)	0	6	51[a]	26	17
Tamil Nadu (grade 5)[b]	1	52[a]	35	9	3

Note: Data were collected in the first semester for grade 4 students in Karnataka, Kerala, and Maharashtra and for grade 5 students in Haryana, Orissa, Madhya Pradesh, and Tamil Nadu. In Assam, data were collected for students in the second semester of grade 4. Assuming that students began grade 1 at age 6 or 7 (age 5 or 6 in Tamil Nadu) and entered grade 4 or 5 three or four years later without repeating a grade, they would be 9 or 10 years of age in grade 4 and 10 or 11 years of age in grade 5 (except in Tamil Nadu).

a. Normative age for grade.

b. Grade 1 entry age is 5 years.

Source: NCERT, NIEPA, and New Concept 1995.

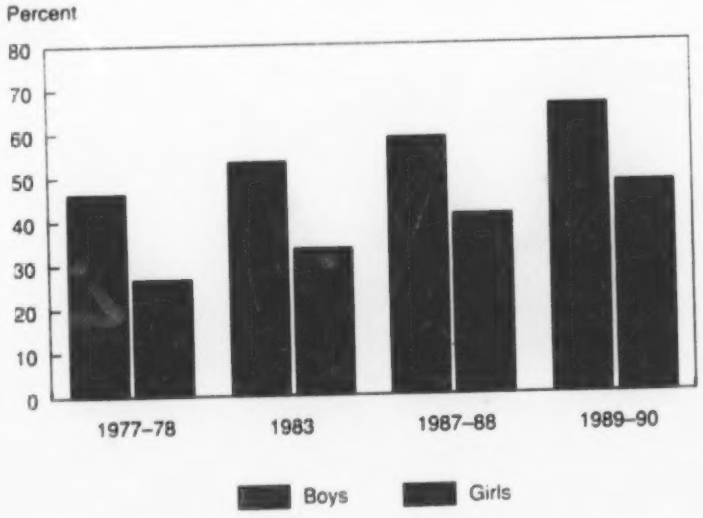
Primary education participation rates are lower than enrollment rates because many children who are enrolled do not attend class regularly. A study of enrollment statistics at the school, block, and district level in Uttar Pradesh found that many children listed on school records attend only briefly and that reported enrollments are inflated at each level of aggregation (Bashir, Ramakrishnan, and Sharma 1993).

Sen and Ghosh (1993) provide another perspective on school participation. Their estimates of the percentage of boys and girls ages 5–14 who are engaged in education more than any other activity during the week before the National Sample Survey is taken show steady improvements in school attendance for both boys and girls (see figure 3.3). The share of those attending school rose from about 36 percent in 1977–78 (about half of boys and a quarter of girls) to about 56 percent in 1989–90 (about two-thirds of boys and half of girls). The gender gap closed only slightly during the 12 years, however, from 20 to 18 percent.

Another source of information on school participation is the 1992–93 NFHS carried out in major states in India (IIPS 1995). In this sample survey 70 percent

Girls' school attendance is rising, but the gender gap persists.

FIGURE 3.3 BOYS AND GIRLS AGES 5–14 ATTENDING SCHOOL, INDIA, SELECTED YEARS, 1977–90



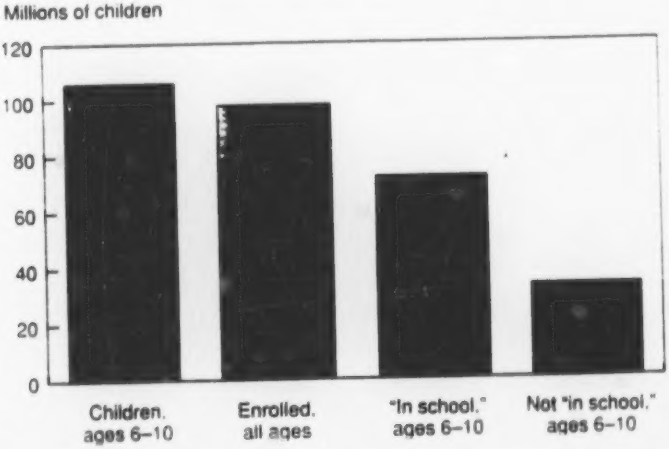
Source: Sen and Ghosh 1993, based on National Sample Survey data.

of children 6–10 years old (76 percent of boys and 61 percent of girls) and 65 percent of children ages 11–14 were reported to be in school; for rural areas this figure drops to 64 percent for children ages 6–10 and 61 percent for children ages 11–14. Attendance rates derived from this survey may be biased upward, as the survey's question "Is (name) still in school?" could be interpreted to mean either "Is (name) enrolled in school?" or "Does (name) attend school?" These figures are referred to as "in school" rates.

Taken together, data from various sources in India suggest that a large share of children ages 6–10 do not attend school regularly and can be considered out of school (see figure 3.4). Although the exact number of children ages 6–10 out of school is not known, estimates of net enrollment rates would put it at about 28 million in 1993, while survey results from the 1993 NFHS would suggest a higher figure of about 32 million children.

Millions of children ages 6–10 remain out of school.

FIGURE 3.4 SCHOOL PARTICIPATION, INDIA, 1993



Source: IIPS 1995; World Bank staff estimates.

Of course, some of these children attend nonformal classes, which offer a condensed course of about two years for children unable to attend formal schools. In 1987 nonformal education centers operated in almost 17 percent of villages in India, serving about 3.4 million children. The Department of Education's 1994–95 annual report estimated that nonformal education centers had the potential to enroll about 6.3 million children (India, Ministry of Human Resource Development, 1995b). Concerns about the quality of the program have shifted the emphasis in nonformal education from expansion to consolidation and improvement (see box 3.1).

Varied Participation among and within States

The national data conceal much variation among and within states in literacy, gross enrollment rates, and school attendance (see table 3.2). Variability is greatest for female literacy, which, as shown in chapter 2, is a key factor in social development. Female literacy rates reported in the NFHS for age 7 and above range from about 25 percent in Bihar and Rajasthan to about 82 percent in Kerala (these rates differ somewhat from those reported in chapter 1 based on the census).[8]

BOX 3.1 NONFORMAL EDUCATION FOR OUT-OF-SCHOOL CHILDREN

Nonformal education, established in 1979–80 as an alternative to the formal system of education, is aimed at children who cannot attend school. The program operates in 20 states and union territories. The central and state governments share the financial responsibility equally for coeducational centers and in a 9:1 ratio for girls' centers (India, Ministry of Human Resource Development, 1995b).

Adaptability, flexibility, and decentralized management are the key characteristics of nonformal education. Some salient features:

- Learning is expected to be comparable with that in formal education.
- The curriculum and instructional materials are adapted to the needs of the learners.
- The total duration is shorter than in formal education.
- Classes are held at times convenient for the learners.
- The instructor is a local person specially trained to run the nonformal education center.
- Learning materials are supplied free of charge.

The number of nonformal education centers increased from 126,000 in 1986 to 255,000 by March 1994, and enrollment grew from 3.56 million to 6.4 million. The number of girls' centers increased from 20,500 to 96,766. More than 425 voluntary agencies, 50 experimental and innovative projects, and 22 district resource units participate in nonformal education programs (India, Ministry of Human Resource Development, 1995b).

Evaluation studies conducted by the National Institute of Educational Planning and Administration (NIEPA) in 1987 concluded that the states' nonformal education programs had significant weaknesses. The studies attributed these weaknesses to insufficient support by national and state authorities, a weak institutional structure, underfunded and poorly motivated staff, weak links with formal schooling so that few children make the transition from informal to formal education, weak community support, and insufficient knowledge of the program. Nonformal education has also suffered because of its secondary claim on resources, which has resulted in low learning achievement, lack of interest among parents, and low motivation among students (India and Bihar 1990).

The correlation between state-level female literacy and school attendance rates is high (0.89), as is that between total literacy and primary completion rates (0.77; Kapoor and others 1994). Primary gross enrollment and attendance rates are lowest in states with the lowest female literacy rates. Gross enrollment rates range from about 70 percent in Bihar and Uttar Pradesh to more than 135 percent in Tamil Nadu; they are more than 100 percent in Gujarat, Karnataka,

TABLE 3.2 LITERACY, ENROLLMENT, AND ATTENDANCE, 15 MAJOR INDIAN STATES, 1992–93
(percent, unless otherwise noted)

State	*Female literacy rate*	*Male literacy rate*	*Primary gross enrollment rate*	*Children ages 6–10 "in school"*	*Children ages 6–10 not in school (thousands)*
Andhra Pradesh	39	60	89	67	2,626
Assam	51	70	96	72	855
Bihar	29	61	71	50	6,012
Gujarat	51	75	110	77	1,116
Haryana	46	72	83	82	393
Karnataka	47	68	111	76	1,307
Kerala	82	90	103	93	199
Madhya Pradesh	34	64	96	56	3,769
Maharashtra	56	80	111	85	1,433
Orissa	41	69	109	72	1,030
Punjab	52	66	81	84	383
Rajasthan	25	60	83	59	2,428
Tamil Nadu	56	77	137	90	586
Uttar Pradesh	32	64	69	61	7,386
West Bengal	55	75	98	73	2,217
All India	43	69	92	69.5	32,254

Source: For literacy and "in school" rates, IIPS 1995; for children ages 6–10 not in school, World Bank staff estimates; primary gross enrollment rates computed from NCERT 1995 enrollment figures and World Bank population estimates.

Kerala, Maharashtra, and Orissa. In states with low female literacy—Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh, and West Bengal—fewer than 70 percent of children attend school regularly. In states with high female literacy, school attendance is almost universal; for example, in Kerala and several of the smaller states (Goa, Himachal Pradesh, Manipur, and Mizuram) more than 90 percent of children are reported to be in school (IIPS 1995).

Variations in School Participation

About two-thirds of the children not in school are girls. More than half the school-age girls in Bihar (62 percent), Rajasthan (59 percent), and Uttar Pradesh (52 percent) do not attend school (IIPS 1995). But many of the children reported as out of school may be enrolled in nonformal education classes.

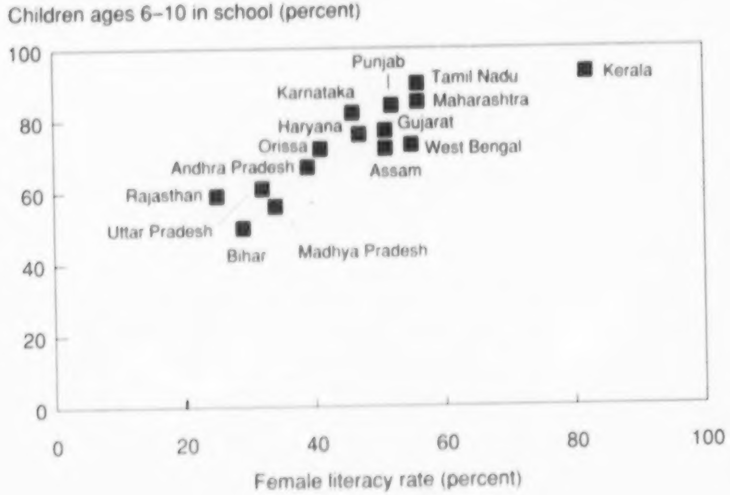
Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal have the most children out of school. These six states contain about half the Indian population but three-quarters of the children out of school. Progress toward reaching the goal of universal primary education clearly depends on increasing enrollment and attendance in these states.

There are also significant variations in school participation within states—between rural and urban areas and among districts. Rural children are less likely to go to school than urban children. For example, the NFHS reports all-India attendance rates for boys ages 6–10 of 86 percent in urban areas and 71 percent in rural areas; for girls the rates are 82 and 55 percent.

Although there is no systematic evidence on school participation at the district level, the high correlation at the state level between female literacy and children's school attendance suggests that there might also be a correlation at the district level (see figure 3.5). In the 15 largest states in India, 168 districts

States with higher adult female literacy rates have a larger share of children 6–10 in school.

FIGURE 3.5 FEMALE LITERACY AND SCHOOL PARTICIPATION, INDIA, 1993



Source: Table 3.2.

TABLE 3.3 LITERACY RATE (AGE 7 AND OLDER) IN HIGH- AND LOW-LITERACY DISTRICTS, SIX INDIAN STATES, 1991
(percent)

State and district	*Male*	*Female*
Low-literacy states		
Uttar Pradesh		
H: Dehradun	78	59
L: Bahraich	36	11
Bihar		
H: Purbi Singhbhum	71	46
L: Kishanganj	33	10
Madhya Pradesh		
H: Durg	74	43
L: Jhabua	26	12
High-literacy states		
Kerala		
H: Kottayan	97	94
L: Palakkad	87	76
Maharashtra		
H: Greater Bombay	88	76
L: Jalma	64	27
Tamil Nadu		
H: Kanniyakumari	86	78
L: Dharmapuri	57	34

Note: H = highest literacy rate; L = lowest literacy rate.
Source: Nanda 1992.

had female literacy rates below 30 percent in 1991 and 67 districts had female literacy rates of 30–40 percent (Nanda 1992). Of the districts with female literacy below 30 percent, 94 percent were in six states: Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal. Yet even states with high literacy rates have districts with below-average literacy. In six states the difference between the highest and the lowest district-level female literacy rates ranges from about 30 to 50 percentage points in the lowest-literacy states and from 20 to 50 percentage points in the highest-literacy states (see table 3.3).

Assuming that the relationship between female literacy and school attendance holds for districts as well as states, the probable school attendance rate in the districts with female literacy below 30 percent would be less than 40 percent. These districts are found in nearly all states. Thus, focusing on districts with low female literacy, which is central government policy under the District Primary Education Program, is an appropriate strategy.

Supply-Side Interventions: Providing the Infrastructure

A first step in increasing access to primary school is to address the supply of schools, classrooms, and teachers. Continuing efforts are required to provide the classrooms and teachers needed to accommodate all children of primary school age. In four states (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) the primary-school-age population will continue to grow over the next 5 to 10 years. In other states the school-age population is not increasing, and capacity is largely adequate in all but the most remote areas. In two states—Kerala and Tamil Nadu—the school-age population has been declining since 1990, and there are few problems of access. Efforts to increase the number of school places therefore need to target selected states and districts.

How many new facilities and teachers are needed? The policy of the government of India is that schools must have a minimum of two rooms and two teachers and that no child should have to walk more than 1 kilometer to school. The wide diversity in local conditions, combined with government policy, gives rise to considerable variations in student-teacher and student-classroom ratios. For simplicity, however, the following discussion assumes that providing good-quality education to all children requires, on average, one classroom and one trained teacher for every 40 children. In reality, ratios are 45 or more to 1 in urban and densely populated areas and much lower in remote and sparsely populated areas, particularly in small, two-teacher schools.

Building Schools and Classrooms

The expansion of enrollment in India has not been matched by a comparable expansion of education facilities. In 1987 India had almost 530,000 primary schools, providing access even in rural areas to a school within 1 kilometer for 95 percent of the population and for 80 percent of villages (NCERT 1992b). Despite this important achievement, shortages of classroom facilities remained widespread. In 1987 more than 8 percent of schools had no building, almost 6 percent operated in thatched huts, and 14 percent occupied *kacha* (mud) buildings. Nationwide, 1.5 million classrooms were available for instruction—almost 700,000 classrooms short of the goal of one classroom for every 40 children enrolled and more than 1 million short of the minimum 2.51 million classrooms needed to enroll the entire age group 6–10 (see table 3.4).

TABLE 3.4 CLASSROOM REQUIREMENTS, SELECTED STATES AND ALL INDIA, 1986 AND 1993

(thousands)

	All India		*Uttar Pradesh*		*Bihar*		*Madhya Pradesh*		*Tamil Nadu*	
Requirement	*1986*	*1993*	*1986*	*1993*	*1986*	*1993*	*1986*	*1993*	*1986*	*1993*
Enrollment	85,913	97,741	11,026	13,006	7,787	8,545	6,932	8,208	7,326	8,018
Classrooms needed for enrolled students	2,148	2,444	276	325	195	214	173	205	183	200
Classrooms available	1,460	—	189	—	131	—	159	—	111	—
In primary schools	1,137	—	183	—	71	—	142	—	81	—
In primary sections	323	—	6	—	60	—	17	—	30	—
Shortfall for enrolled students	688	—	87	136	63	83	15	46	72	89
Population ages 6–10	100,348	105,751	—	18,939	—	12,024	—	8,565	—	5,856
Classrooms needed for entire age group 6–10	2,509	2,643	—	473	—	301	—	214	—	146
Shortfall for entire age group 6–10	1,049	1,183	—	284	—	170	—	55	—	35

— Not available.

Note: Assumes a student-classroom ratio of 40:1 and, for primary school sections, a one-teacher, one-classroom ratio.

Source: For 1987, enrollment and classrooms, Fifth All-India Education Survey (FAIES); for 1993 enrollment and classrooms, Sixth All-India Education Survey (SAIES) provisional statistics; for 1993 population ages 6–10, World Bank staff estimates.

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Furthermore, much of the stock of classrooms is in poor repair, and many schools lack a water supply and adequate sanitary facilities. A survey in Uttar Pradesh revealed that 54 percent of the schools had no water supply, 80 percent lacked latrines, and 69 percent held classes outdoors (Bashir, Ramakrishnan, and Sharma 1993).

By 1993 the number of classrooms required for the age cohort had grown to almost 2.65 million, 1.2 million more than had been available in 1987. (No data are available on the stock of classrooms after 1987.) By 1993–94 the number of primary schools had increased almost 9 percent (from 530,000 in 1987 to 575,000), and almost 150,000 classrooms had been constructed under Operation Blackboard (India, Ministry of Human Resource Development, 1995b). These data suggest that although progress is being made in providing schools in unserved or inadequately served settlements, the supply of classrooms may not have kept up with the 14 percent growth in enrollment between 1986 and 1993. As a result, in many states classrooms are overcrowded or classes are held outside. In many parts of India schools can function quite effectively outdoors for part of the school year, but inclement weather inevitably reduces the number of days of instruction.

Classroom shortages are particularly severe in Uttar Pradesh and Bihar (table 3.4). In 1986 these states had less than 70 percent of the classrooms needed to accommodate all the children enrolled. By 1993 enrollment growth had increased the number of classrooms needed from 276,000 to 325,000 in Uttar Pradesh and from 195,000 to 214,000 in Bihar. Both to meet the needs of enrolled students and to provide a place in school for all children ages 6–10 not now enrolled (assuming no overage students and a 40:1 student-to-classroom ratio) would require adding 284,000 classrooms in Uttar Pradesh and 170,000 classrooms in Bihar, an increase over the 1986 stock of classrooms of 150 percent in Uttar Pradesh and 130 percent in Bihar. These large needs stem from the currently low enrollment rates and high population growth rates in these states.

By contrast, in Madhya Pradesh, representative of states with typical enrollment and population growth rates, the stock of classrooms would need to grow about 30 percent to accommodate the 1993 enrollment and about 35 percent to accommodate the total age cohort 6–10. Achieving this growth is challenging, but not impossible. Tamil Nadu is representative of states in which population growth rates have declined but demand for education has been stimulated. The drop in fertility rates in Tamil Nadu over the past decade has virtually stabilized the size of the 6–10 cohort, yet a surge in demand for education and the large number of overage students enrolled (the 1994 gross enrollment rate in Tamil Nadu was almost 130 percent) have resulted in a classroom shortage nearly as acute as that in Madhya Pradesh.

Hiring and Deploying Teachers

In 1993 there were almost 2 million teachers in India, reflecting an increase of about 9 percent since 1986 (NCERT 1995). This growth was not enough to make progress toward full enrollment, however, or even to keep up with the growth of enrollment (14 percent) during that period. As a result, the student-teacher ratio increased from about 45:1 in 1986 to 49:1 in 1993. Reversing this trend and reducing the ratio to an average of 40:1 (the normative ratio in India) would require creating an additional 460,000 teaching positions, bringing the total number of teachers to 2.4 million. To enroll the entire age cohort 6–10 (with no overage students) would require more than 2.6 million teachers (see table 3.5).

A student-teacher ratio as high as 49:1 makes introducing more effective teaching and learning strategies difficult and places an undue burden on teachers, especially in the classrooms—common in rural India—that combine many grades and ages. In practice, however, absenteeism among students, which can run as high as 25 percent, especially in rural areas, reduces the average student-teacher ratio to about 40:1. But as efforts to improve attendance intensify, the ratio is likely to rise, and hiring more teachers will become critical if the quality of teaching is to improve.

The national average hides a wide range of situations in the states, however. The 1993 student-teacher ratio ranges from a low of 38:1 in Assam and 40:1 in Orissa to more than 60:1 in Bihar, Karnataka, and Tamil Nadu and 79:1 in Gujarat. Even if discounted for nonattendance, the higher ratios are so high that any normal instructional process is very difficult. Reducing these rates to 40:1 would require doubling the number of teachers in Gujarat and increasing the number of teachers about 60 percent in Bihar and about 50 percent in Andhra Pradesh, Haryana, and Tamil Nadu.

Enrolling the entire age group 6–10 would require 166,000 additional teachers (an increase of 54 percent) in Uttar Pradesh, 170,000 (130 percent) in Bihar, 78,000 (64 percent) in Andhra Pradesh, 53,000 in Gujarat (78 percent), and 44,000 in Rajasthan (42 percent). In other states (such as Assam, Kerala, Madhya Pradesh, Orissa, and Tamil Nadu) almost enough teachers would be available to teach the age group 6–10 if the number of overage students in the system could be drastically reduced. In several states teacher shortages persist even though a large number of trained teachers (30,000 in Uttar Pradesh alone) are waiting to be appointed. This imbalance suggests that these states are not allocating the resources necessary to fund adequately an expanded education system.

The problem of teacher shortages is compounded when, as is often the case in rural schools with high dropout rates, the student-teacher ratios are highest in the first few grades and when, as is also often the case, the least experienced

TABLE 3.5 PRIMARY TEACHERS AND TEACHER REQUIREMENTS, 15 MAJOR STATES AND ALL INDIA, 1993

(thousands, except where otherwise specified)

State	*Primary teachers*[a]	*Ratio of enrolled students to teachers*	*Additional teachers needed to reduce ratio of entrolled students to teachers to 40:1*	*Additional teachers needed for entire age cohort 6–10 student-teacher ratio of 40:1)*
Andhra Pradesh	121	58:1	55	78
Assam	77	38:1	–4	–1
Bihar	131	65:1	83	170
Gujarat	68	79:1	66	53
Haryana	31	59:1	15	24
Karnataka	99	61:1	52	37
Kerala	62	47:1	11	9
Madhya Pradesh	197	42:1	8	17
Maharashtra	212	50:1	53	27
Orissa	100	40:1	–1	–8
Punjab	45	42:1	3	15
Rajasthan	104	48:1	20	44
Tamil Nadu	130	61:1	70	16
Uttar Pradesh	307	42:1	19	166
West Bengal	160	50:1	41	45
15-state total	1,844	51:1	490	693
All India	1,984	49:1	460	660

a. The total number of teachers is the sum of teachers in primary school in 1993 (for all of India, 1.7 million) and teachers in primary sections in 1987 (for all India, 0.3 million), the most recent year for which such data are available.

Source: NCERT 1992b, 1995.

teachers are assigned to those grades. In addition, although many single-teacher schools (which accounted for about 30 percent of all schools in 1987) have been eliminated under Operation Blackboard, more than half of India's primary schools have fewer teachers than grades.[9] Teacher absenteeism and teacher assignments favoring urban areas further increase the class-teacher ratio. In these circumstances teachers cannot provide individual attention to students and must rely on formal didactic methods to manage as many as 70–80 children with varying readiness to learn. The result is low-quality education and high dropout rates by grade 2.

Demand-Side Interventions: Enhancing Incentives for School Attendance

Why are children out of school? That is, why do some fail to enroll in the first place, and why do some who do enroll fail to complete the primary school cycle? All the available evidence points to a constellation of factors, including the poor quality of much schooling, weak implementation of compulsory schooling laws, grade repetition, and high demand for child labor. Girls and students from scheduled castes and tribes are also affected by special factors, which are treated in chapter 5.

Improving the Quality of Schooling

Improving the quality of schooling to increase the demand for it is the most important demand-side intervention for retaining children in school. Improving school quality can also make the flow of students more efficient; research in Brazil found that students with higher levels of learning were more likely to be promoted on time than those with lower levels of learning (Harbison and Hanushek 1992). By improving the flow of students, resources that would otherwise be spent on students who repeat can be spent to improve school quality and expand access (raising quality is treated at length in chapter 4).

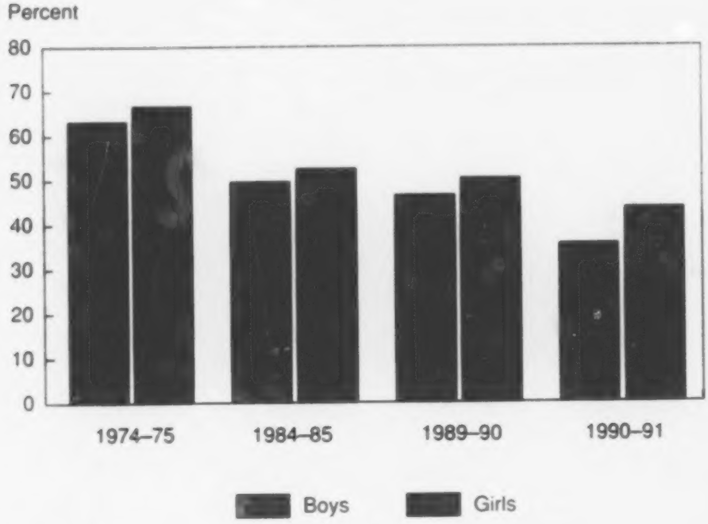
Enforcing Compulsory Attendance Laws

Enforcing compulsory education could reduce the number of dropouts. Dropout rates have declined in recent years (see figure 3.6), yet almost half the girls and a third of the boys do not complete primary education. A particular cause for concern is that more than half of students who drop out do so in grades 1 and 2, well before they can be expected to have learned much of the curriculum (Mehta 1995a). International experience suggests that about four to six complete years of instruction are needed to develop sustainable basic skills in language and mathematics. The dropout rate in early grades is especially high in states with very high overall dropout rates (Andhra Pradesh, Bihar, Rajasthan, and West Bengal). On average, dropouts had completed only 2.4 years of education.

Education is compulsory in most states, and in 1993 the Supreme Court of India "ensured free and compulsory education to all children up to the age 14 as a fundamental right" (Mehta 1994b, p. 63). However, the laws making education compulsory are seldom enforced. Although enforcing these laws may be out of reach for some states, it is feasible in states with already high primary school participation, such as Kerala, where *ayas* (child care assistants) are

Dropout rates are declining but remain unacceptably low.

FIGURE 3.6 DROPOUT RATES, BY GENDER, INDIA, 1974–91



Source: Mehta 1995a.

employed in some schools to accompany truant students to school. Other strategies to improve school attendance include monitoring of student attendance by community school organizations (known as village education committees), enrollment campaigns, and village-level surveys that identify students who are not in school. Village education committees are not yet active in all states, but they meet regularly in some such as Kerala and Maharashtra. District and community education committees authorized under *panchayati raj* legislation could also help enforce compulsory schooling.

Enforcing compulsory attendance would also increase enrollment and completion rates. Children who are not enrolled account for an important proportion of the children that schools report as dropouts. A recent study comparing household survey data with school enrollment data for 110 villages in Assam and 10 villages in West Bengal found fewer children dropping out of school and more children failing to enroll than were reported by schools (Chattopadhya 1995).

Implementing Automatic Promotion

Automatic promotion, although questionable on pedagogical grounds, is one way to reduce repetition. Policies on repetition vary considerably between states. Some states (such as Maharashtra and Karnataka) follow a "no detention" (automatic promotion) policy throughout the primary grades, while others follow a policy of no detention up to grade 2 (Haryana) or grade 3 (Uttar Pradesh). Data on repetition are not reported regularly, and those that are reported are unreliable. With the exception of Gujarat, reported repetition rates are comparatively low in most states (see table 3.6).

The incidence of repetition may be considerably higher than suggested by the officially reported data, however. In the low-literacy districts covered by the DPEP baseline studies, 20–40 percent of students in grades 4 or 5 have repeated at least one year (see figure 3.7). Rural enrollments clearly include overage students, many of whom have repeated one or more years of school. Repetition may thus be a much more significant cause of overage enrollment than suggested by the officially reported data. Even when a district constructs enough spaces for students of primary school age, it will not be able to accommodate all students of that age group without crowding, if overage repeaters occupy school places. Observations of rural primary schools in eight states indicate that overcrowding is common, especially in lower grades. Primary-level dropout rates are lower in the states that require automatic promotion for at least some of the earlier grades.

Offsetting the Cost of Children's Labor

Children work in India, and their work often accounts for their absence from school. According to Burra (1995), 10 percent of marginal workers and 5 percent of those working more than 185 days a year are under the age of 15. More than 3 million children work in the *beedi* (cigarette) industry alone. When the demand for their labor is highest, children stop coming to school. Jacoby and Skoufias (1995) found that children in agrarian households in rural India are withdrawn from school in seasons when income is low and child productivity is high.

Burra identifies four groups of working children: bonded children in industry, bonded children in agriculture, street children, and children contributing to family labor. Bonded children often come from India's poorest families. These families receive very little for their children's paid labor: a small cash advance (a "mortgage" of Rs200) and the child's daily wage. The children's wage, less than Rs3 a day, is far smaller than the official minimum wage of Rs16 and is made even smaller by employers' deductions for food and housing (Burra 1995).

TABLE 3.6 PROMOTION, REPETITION, AND DROPOUT RATES, BY GRADE, SELECTED STATES AND ALL INDIA, 1990

(percent)

	Grade 1		*Grade 2*		*Grade 3*		*Grade 4*		*Grade 5*	
Indicator	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
India										
Promotion	87.5	85.7	82.2	84.3	88.6	85.0	90.5	87.1	n.a.	n.a.
Repetition	5.2	5.3	2.6	2.8	3.2	3.3	4.2	4.0	4.3	4.2
Dropout	7.8	9.0	7.8	12.9	8.3	11.7	5.3	8.9	n.a.	n.a.
Bihar										
Promotion	58.2	56.9	80.4	78.5	83.7	83.5	87.5	83.2	n.a.	n.a.
Repetition	7.8	7.8	4.6	5.1	3.6	4.1	2.8	3.6	3.1	3.8
Dropout	34.0	35.3	15.0	16.4	12.7	12.4	9.7	13.2	n.a.	n.a.
Gujarat										
Promotion	64.3	60.2	75.8	72.3	74.4	69.5	74.8	73.6	n.a.	n.a.
Repetition	34.9	37.3	19.2	20.7	21.8	21.6	18.4	16.6	17.7	15.6
Dropout	0.8	2.5	5.0	7.0	3.8	8.9	6.8	9.8	n.a.	n.a.
Rajasthan										
Promotion	62.8	64.7	67.2	59.9	95.0	87.0	88.4	87.5	n.a.	n.a.
Repetition	3.2	2.4	3.0	2.4	1.7	1.5	2.8	2.1	2.2	1.7
Dropout	34.0	32.9	29.8	37.7	3.3	11.5	8.8	10.4	n.a.	n.a.
Tamil Nadu										
Promotion	87.4	87.3	90.9	90.8	91.6	91.9	92.1	89.8	n.a.	n.a.
Repetition	1.1	1.0	1.0	1.0	1.1	1.0	7.4	7.0	7.1	6.9
Dropout	11.5	11.7	8.1	8.2	7.3	7.1	0.5	3.2	n.a.	n.a.
Uttar Pradesh										
Promotion	88.4	90.4	99.5	99.1	83.6	76.9	84.6	77.6	n.a.	n.a.
Repetition	—	—	—	—	—	—	5.2	4.9	1.8	2.2
Dropout	11.6	9.6	0.5	0.9	16.4	23.1	10.2	17.5	n.a.	n.a.

n.a. not applicable.

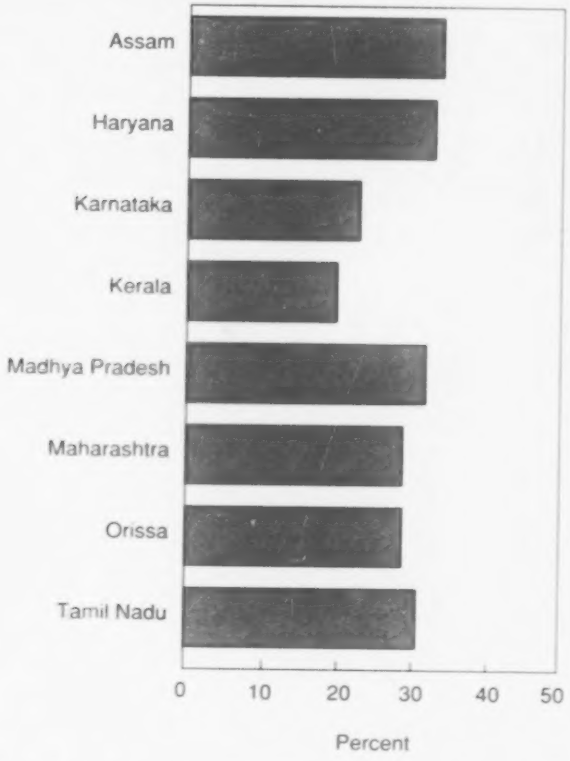
— Not available.

Source: Mehta 1995a.

Examining the reasons for dropping out among children ages 6–14, NCAER (1994) found that 68 percent of boys and 56 percent of girls reported dropping out for financial reasons. Data from the National Sample Survey show that, among children over 6 years of age who never enrolled, 50 percent of boys and 33 percent of girls did not enroll as a result of economic factors.

Grade repetition is widespread in low-literacy districts.

FIGURE 3.7 GRADE 4 AND 5 STUDENTS WHO HAVE REPEATED AT LEAST ONE YEAR IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993



Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

To offset the opportunity costs of children's labor could require "bonding" children to school at a rate equal to what families would receive if their children worked. Although several incentive programs in India try to offset some of the direct costs of schooling, none compensates families for children's labor. The cost of doing so would probably be unsustainable, however: Rs19.2 billion, or about $600 million, a year, nearly a quarter of the resources required to sustain the present education system (chapter 10).[10]

Improving Student Flow to Reduce Costs

Establishing an education infrastructure that provides access to good education for all students is made more expensive by inefficiencies in the flow of students, which are caused by dropout and repetition. A simulation of the cumulative effect of repetition and dropout on primary school completion shows that fewer than two-thirds of the students who enter primary school ever graduate from it (see table 3.7). To produce these 651 graduates from an entering class of 1,000, 4,207 student-years of inputs (6.46 years per graduate) must be provided, compared with 3,255 (5 years per graduate) in a perfectly efficient system. This represents an excess resource input of almost 30 percent.

Moreover, when children drop out after only one or two years of schooling, public resources are probably wasted because most retain little of what they learned in such a short time. And when children repeat grades, extra resources are required for them to complete the primary school cycle.

This section explores different scenarios for enrollment of the primary-school-age cohort from the school year 1995–96 to the school year 2008–09, together with their broad cost implications. A first scenario is developed from trend analysis to indicate what will happen if no changes take place in rates of dropout, repetition, and overage entry. Three other scenarios explore the effects on enrollment of changes in these rates.

None of the projections is intended to be precise. The scenarios have been developed only to estimate broadly the national cost implications of different policies affecting enrollment.[11] They provide only estimates of future outcomes, in part because the underlying base of enrollment data is incomplete.[12] The scenarios are useful, however, because of the insight they can provide policymakers about the approximate effect of different policies on the size (and thus the financing needs) of the education system. (Implications for education finance—for the central government and for the states—are discussed in chapter 10.)

TABLE 3.7 SURVIVAL IN PRIMARY EDUCATION FOR 1990 COHORT, BY GRADE AND GENDER, INDIA

Gender	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 4*	*Grade 5*
Total	1,000	912	778	700	651
Male	1,000	904	783	688	624
Female	1,000	917	774	707	667

Source: Simulation by Arun Mehta, allowing multiple repetitions.

Present policies and programs have been designed both to achieve universal primary enrollment and to improve efficiency. Demand-side programs designed to increase enrollment and reduce the dropout rate would increase the number of students coming to school each day over past trends. Programs intended to reduce repetition and late entry would have the opposite effect. The effects of such programs are reflected in the following scenarios, based on different assumptions about cohort entry rates, dropout rates, and repetition rates:

- *Scenario 1: Trend projection.* Used as a comparator, this scenario assumes no change in entry, dropout, and repetition rates.

- *Scenario 2: Moderate efficiency gains.* This scenario models the effect of reducing dropout and repetition rates by somewhat more than half by 2005 and reducing the cohort entry rate to 110 percent of the male age group and 105 percent of the female age group by the end of the 13-year projection period.

- *Scenario 3: Rapid reduction in entry cohort.* This scenario models the effect of reducing the entry rate more rapidly to reach the levels of scenario 2 by 2005. Changes in repetition and dropout rates are the same as in scenario 2.

- *Scenario 4: Age group only from 2001–02.* This scenario models the effect of restricting entry into grade 1 to children 6 years old from the school year 2001–02 onward. Although probably not feasible, such a policy could have a significant effect on enrollment. Repetition and dropout rates are as in scenarios 2 and 3.

Mehta estimates that in scenario 1, which assumes current entry, dropout, and repetition rates, the system would provide 1.56 billion student-years of schooling over the 13-year projection period (see table 3.8). To produce the same number of graduates in a perfectly efficient system would require 1.26 billion student-years of education. Thus, compared with a fully efficient system, the system under scenario 1 would provide 300 million excess student-years, requiring 24 percent more in recurrent costs. The changes under scenario 2 would reduce the excess years of education provided by 48 percent, and the changes under scenario 3 would do so by slightly more. Scenario 4 would reduce the number of excess years provided by as much as 55 percent.

The highest potential efficiency gains associated with improvements in the flow of students—between 24 and 39 percent—can be realized in Andhra Pradesh, Bihar, Karnataka, Orissa, Rajasthan, and Uttar Pradesh (see table 3.9). In these states the payoff to improvements in the quality of instruction and in

TABLE 3.8 DIFFERENT PRIMARY ENROLLMENT SCENARIOS TO 2008–09, INDIA

(percentages, unless otherwise noted)

Indicator	*Scenario 1, trend projection*	*Scenario 2, moderate efficiency gains*	*Scenario 3, rapid reduction in entry cohort*	*Scenario 4, age group only in 2001–02*
Cohort entry rate		*By 2009*	*By 2005*	*By 2001*
Boys	132	110	110	100
Girls	132	105	105	100
Dropout rate		*By 2005*	*By 2005*	*By 2005*
Boys	36.5	10.1	10.1	10.1
Girls	42.5	21.6	21.6	21.6
Repetition rate		*By 2005*	*By 2005*	*By 2005*
Boys	19.5	7.4	7.4	7.4
Girls	19.6	9.7	9.7	9.7
Student-years (millions)				
Total provided	1,560	1,578	1,561	1,494
Minimum required	1,255	1,420	1,417	1,361
Excess provided	305	158	144	133

Source: Mehta 1995a.

attendance can be expected to be very high, and with the savings from the efficiency gains, the improvements need not mean much increase in the cost per graduate. Educational development policies in these states will therefore need to pay particular attention to reducing dropout and repetition rates.

Conclusions

Reaching full enrollment of the age group 6–10 remains a major challenge in all states of India and a distant goal in some. Although there is considerable uncertainty about the reliability of the available data on India's education system, the following picture emerges. On the positive side, more than 80 percent of 6-year-olds enroll in school, enrollment by girls increased 20 percent between 1986 and 1993, and about 70 percent of children ages 6–10 years old attend school regularly. Not surprisingly, about 75 percent of the children who are out of school live in six states—Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal. There are severe shortages of teachers and classrooms, especially in the most populous states.

TABLE 3.9 EXCESS STUDENT-YEARS PROVIDED UNDER DIFFERENT PRIMARY ENROLLMENT SCENARIOS TO 2008–09, 15 MAJOR INDIAN STATES

(millions, unless otherwise noted)

State	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Gain, best scenario (percent)*
Andhra Pradesh	32.28	19.68	20.27	18.60	29
Bihar	46.83	40.67	44.89	42.46	35
Gujarat	20.83	11.94	10.47	8.04	23
Haryana	3.60	3.47	3.40	2.83	13
Karnataka	23.56	12.85	10.54	7.76	29
Kerala	0.51	1.67	1.46	1.52	01
Madhya Pradesh	22.94	19.03	18.29	16.03	18
Maharashtra	26.94	17.45	16.33	12.62	17
Orissa	17.98	10.00	8.64	7.12	26
Punjab	3.83	4.83	4.74	4.16	15
Rajasthan	25.06	18.10	16.22	13.65	39
Tamil Nadu	5.86	2.84	2.28	1.38	06
Uttar Pradesh	45.74	46.05	44.18	37.90	24
West Bengal	19.91	11.71	9.45	4.04	16
All India	304.61	157.61	144.97	132.33	20

Source: Mehta 1995a.

On the negative side, growth in enrollment between 1986 and 1993 was modest (13.8 percent), and the official gross enrollment rate increased only 4.2 percentage points to reach 95 percent in 1993–94; about 15–20 percent of the children enrolled are overage; about 15–20 percent of the children enrolled do not come to school regularly; about 35 percent of those who do enroll drop out before completing the primary school cycle; and about 32 million children remained out of school in 1993.

To address this situation, the government of India has made a commitment to the goals of the 1990 Conference on Education for All at Jomtien. It has set a goal of providing good-quality education to all primary-school-age children and has committed itself to ensuring that the necessary resources are available, indicating that the allocation to education will increase from less than 4 percent of gross national product (GNP) to 6 percent. Improving the quality of primary education and using available resources more efficiently are priorities that no state can ignore. Several states—Karnataka, Kerala, Maharashtra, Punjab, and Tamil Nadu—now have the capacity to enroll all children and by improving efficiency could reach the Jomtien goals in the foreseeable future.

Other states—and districts within states—will require special attention if India wishes to make real progress toward the Jomtien goals. National progress will critically depend on progress in the six states that have three-quarters of the children out of school. Almost half the additional classrooms and teachers required to enroll all children ages 6–10 are needed in Bihar and Uttar Pradesh. Rajasthan has the lowest female literacy rate and the second lowest (after Bihar) proportion of children ages 6–10 attending school. Andhra Pradesh, Madhya Pradesh, and West Bengal are populous states with below-average school attendance ratios. It is in these six states where the key challenges of educational development lie and where the success of the government's policy goals will be determined.

All these states have taken encouraging steps. Madhya Pradesh and Uttar Pradesh have recently launched massive programs to tackle the challenges of primary education development. Andhra Pradesh and West Bengal are starting the District Primary Education Program in five districts. Rajasthan has initiated several innovative programs that, if expanded, could change the state's education profile. Bihar has implemented smaller-scale innovations with assistance from UNICEF, with institutional and managerial weaknesses still precluding the large-scale programs needed.

This chapter has shown the great diversity in the education challenges that states face, underscoring the importance of formulating education policies specific to each state and district. Expanding the physical infrastructure is critical in several states, while recruiting more teachers is important in others. Preventing dropouts in the early grades is crucial in some states; in others avoiding repetition is key. Recently, more policies are being formulated to allow the greatest possible flexibility and to emphasize the needs of states that face particularly difficult educational development challenges.

Technical Note

An initial picture of the demographics of primary education in India is gained from official enrollment statistics for 1993, which put primary enrollment at 108.2 million children and the gross enrollment rate at 104.5 percent. Official enrollment statistics report the total number of children in all primary grades entered on school registers as of September 30 of any given year. This total is then expressed as a percentage of the number of children ages 6–10 as estimated from projections based on census data. For the past decade estimates have been based on the 1981 census, although projections for 1995 based on the 1991 census have recently become available. Provisional statistics from the 1993 Sixth All-India Education Survey report fewer children enrolled: total primary enrollment of 97.7 million children and a gross enrollment rate of 96 percent, up from 92 percent in 1987.

TABLE 3.10 GROSS ENROLLMENT RATES, BY SOURCE OF ENROLLMENT AND POPULATION ESTIMATES, INDIA, 1987 AND 1993

(percent)

	Source of enrollment estimate			
	1987		*1993*	
Source of population estimate	*Government of India*	*NCERT*	*Government of India*	*NCERT*
Government of India	95.9	94.6	104.5	94.4
NCERT	92.7	91.7	106.2	95.9
World Bank staff	86.8	85.6	102.3	92.4

The gross enrollment rate also depends on accurate estimates of the primary-school-age population (ages 6–10). The government of India based its estimates on data from the 1981 census until 1995, as did the NCERT. World Bank staff have also estimated the population ages 6–10, on the basis of the 1991 census (see appendix C, table C.4). Gross enrollment rates based on population estimates from these different sources range from 86 to 96 percent for 1987 and from 92 to 106 percent for 1993 (see table 3.10).

Official gross enrollment rates overestimate enrollment of the age cohort because they include students who fall outside the official age range of 6–10 years; in India most of these students are overage. Net enrollment rates do not include underage or overage students and thus are more accurate indicators of the actual coverage of the education system. But net enrollment rates require age by grade enrollments, which, as in many other countries, are not now available in India (Colclough and Lewin 1993). The Fifth All-India Education Survey (NCERT 1992b) reported a net enrollment rate of 76 percent for 1986 (86 percent for boys and 65 percent for girls) based on age cohort populations from the 1981 census. A recent paper by Mehta (1995b) compares official statistics from the Ministry of Human Resource Development with NCERT data. This book uses the most recent independent estimates of enrollments and age cohort data available.

CHAPTER FOUR

Enhancing Learning Achievement

As chapter 3 shows, India has gone a long way toward providing a primary school for most settlements. Indeed, in some states the primary education system has more places than children in the primary-level age cohort. This is an impressive accomplishment. But the test of an education system is its ability to teach, which is best judged by the learning achievement of all students. Studies by the National Council of Educational Research and Training, the National Institute of Educational Planning and Administration, and other Indian research institutions show that learning achievement in India is very low. The most important challenge for primary education in India is therefore to improve educational outcomes.

Studies in India and around the world suggest that parents' investment in their children's education—purchasing books and supplies and forgoing their children's labor—may be the most effective way to boost learning achievement. In India, poverty limits the ability of many parents to make the necessary investment.

For the foreseeable future, then, strategies for raising learning achievement will need to focus on improving the quality of education in schools. Particularly important is to improve the quality of rural primary schools, where more than 78 percent of children are educated (Shukla and others 1994). Not only should providing better services directly improve learning achievement, it should also increase the schools' attractiveness to children and parents alike and thus lead to higher enrollment and attendance. Achieving acceptable levels of quality will require strategies that take into account variation in access, completion, and learning achievement in primary education within and among states. Strategies also need to take account of the fact that girls, the poor, and students from scheduled castes and tribes tend to stay in school for the shortest period and to score below average.

Drawing on empirical studies, this chapter reviews the effectiveness of different inputs at the school level for increasing learning achievement.[1] The evidence shows that the inputs vary in effectiveness across states and districts, making it important to enable states, districts, and even schools to make their own decisions about which inputs to invest in.

To make such decisions, education authorities need to know which inputs are most cost-effective. This chapter uses results from hierarchical linear modeling analyses of data from the DPEP baseline assessment studies to estimate the relative cost-effectiveness of selected inputs across states (see World Bank 1996); similar approaches could be used to identify the most cost-effective inputs in each state.

Low Achievement

Few empirical studies of learning achievement at the primary level have been carried out in India (Dave forthcoming; NCERT 1996a). The available evidence, however, shows that primary-level learning achievement is low, that it varies according to the background of the child, and that it varies across schools.

Children who reach the final year of lower primary school (grade 4 in some states and grade 5 in others) often have mastered less than half the curriculum taught the year before. A rigorous study of student achievement found that about 70 percent of grade 4 students and 60 percent of grade 5 students from schools in a "privileged urban zone" in Madhya Pradesh had not mastered competencies in Hindi and mathematics that would be expected of grade 2 students. And in a "highly underdeveloped rural zone," no grade 4 or grade 5 students had mastered the grade 2 competencies (Govinda and Varghese 1993).[2]

A recent study of Bengali and mathematics achievement at the end of grade 4 in 15 districts of West Bengal found that only about 20 percent of the students obtained the minimum expected score in both subjects (Roy, Mitra, and Ray 1995). Another study found that a significant share of students receive marks too low to advance to the next grade. In a study of the Primary Education Curriculum Renewal Project in 22 states, Dave and others (1988) reported that the average grade 4 achievement was 35 percent in language, 32 percent in mathematics, 34 percent in social studies, and 32 percent in science, compared with a passing mark of 35 percent for each subject.

A 1991 study conducted in 23 states by the NCERT found that, for a sample of 65,000 urban and rural grade 4 students, the average achievement on grade 4 curriculum-based, basic skills tests of arithmetic, reading comprehension, and spelling was 46.4 percent (Shukla and others 1994).[3] Students correctly answered fewer than half the arithmetic questions in 19 states and fewer than half the reading comprehension questions in 16 states, and they correctly spelled fewer than half the words on a spelling test in 15 states.

Similar results were found in two studies of learning achievement in 1,700 randomly sampled schools in 43 low-literacy districts in eight states participating in the DPEP sponsored by the government of India. Random samples of 18,000 students in grade 2 were tested on simple literacy and numeracy skills (Prakash and Panda 1996), and random samples of 24,000 students in the last class of the primary school cycle (grade 4 in some states, grade 5 in others) were tested on arithmetic and reading comprehension skills expected at the end of the previous year (Saxena, Singh, and Gupta 1995). The studies found low average achievement levels for all grades.

By Region

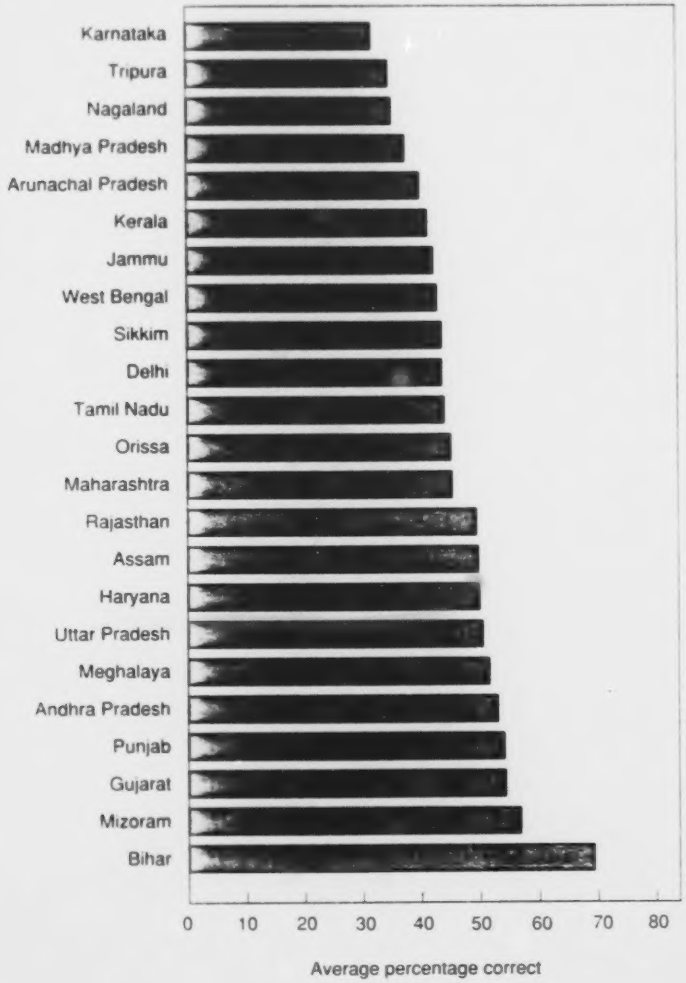
Differences in learning achievement among states and districts are large. In the 1991 study students in the lowest-achieving state, Karnataka, achieved only 45 percent as much as students in the highest-achieving state, Bihar (see figure 4.1).[4] The DPEP studies also found large differences among districts (see figures 4.2 and 4.3) and between states.[5]

By Gender and Socioeconomic, Tribal, and Caste Status

In India average student achievement also varies by gender, caste, tribe, and household socioeconomic status. The 1991 NCERT study found that average gender differences are relatively small—less than 1 percentage point in most states—and typically favor boys (see table 4.1). In Bihar, Karnataka, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal boys scored higher than girls, but in Gujarat and Punjab girls scored higher. In states with high and equal primary school participation rates, such as Kerala and Tamil Nadu, the study found no overall differences in achievement between boys and girls. The achievement of students in scheduled castes and scheduled tribes is at least 1 percentage point lower than the achievement of other students in nearly all states. Household income also affects achievement. Although no direct correlations of household income and student achievement are available for India, proxies for household welfare—parents' education and father's occupation—are correlated with achievement in all studies. Chapter 5 reviews the evidence

Student achievement varies widely by state.

FIGURE 4.1 TOTAL ACHIEVEMENT (ARITHMETIC, READING, AND LANGUAGE), 23 INDIAN STATES, 1991



Source: Shukla and others 1994.

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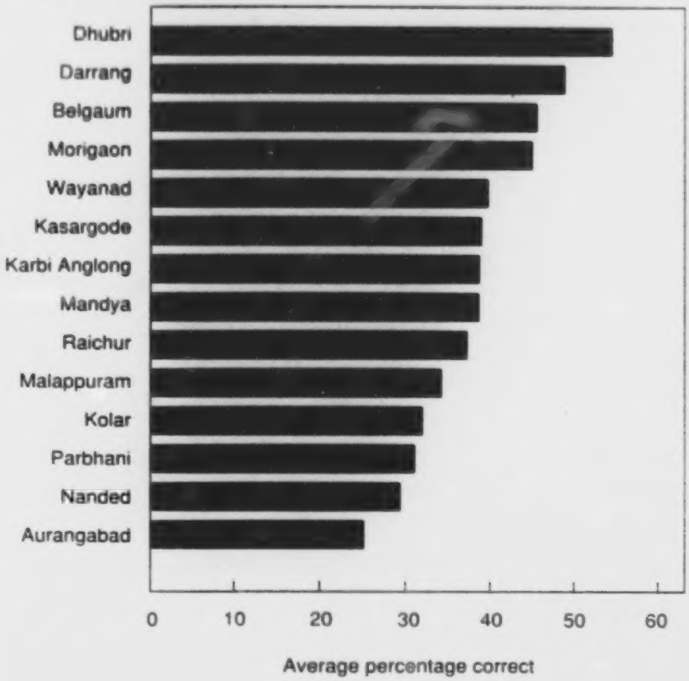
In low-literacy districts arithmetic achievement varies widely but is generally low in grade 4.

FIGURE 4.2 GRADE 4 ARITHMETIC ACHIEVEMENT IN SELECTED LOW-LITERACY DISTRICTS, FOUR INDIAN STATES, 1993



Note: Students in Dhubri, Darrang, Morigaon, and Karbi Anglong were tested six to seven months later than students in other districts.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

on these gaps, what accounts for them, and the interventions that have been found to reduce them.

Research also shows that the gender gap varies among schools, while gaps due to socioeconomic, caste, and tribal status are consistent across schools in all but one or two states (Saxena, Singh, and Gupta 1995). Chapter 5 also discusses interventions for reducing gaps within schools.

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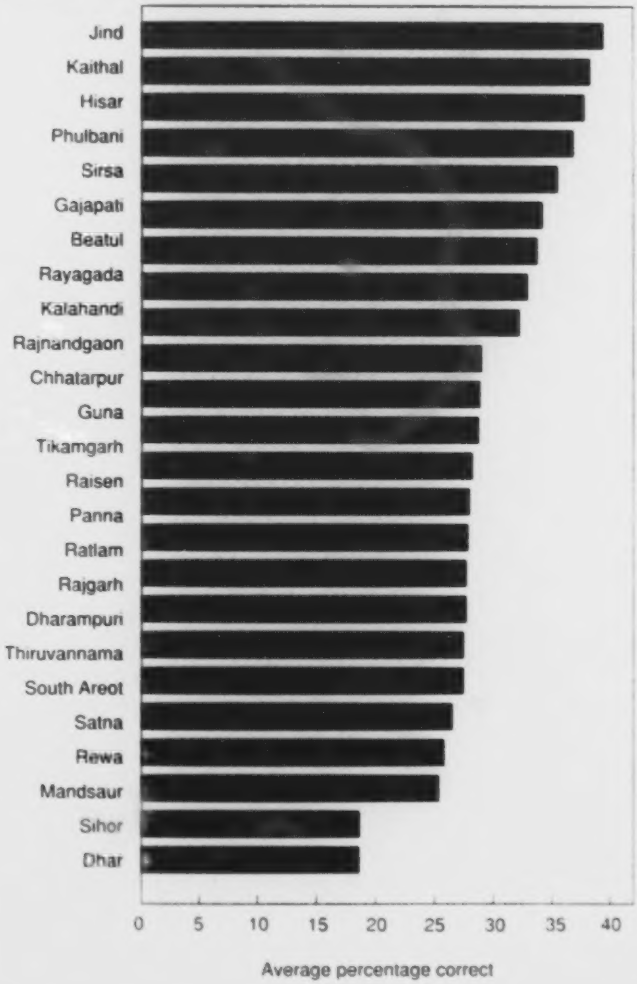
Grade 5 arithmetic achievement also varies and is low.

FIGURE 4.3 GRADE 5 ARITHMETIC ACHIEVEMENT IN SELECTED LOW-LITERACY DISTRICTS, FOUR INDIAN STATES, 1993



Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

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TABLE 4.1 AVERAGE GRADE 4 ACHIEVEMENT, 15 MAJOR INDIAN STATES, 1991
(number of items correct)

State	*Boys*	*Girls*	*Scheduled castes*	*Scheduled tribes*	*Backward castes*	*Others*
Andhra Pradesh	110	111	108	100	111	111
Assam	102	104	90	91	114	105
Bihar	144	142	144	123	146	148
Gujarat	111	113	107	118	110	112
Haryana	104	102	100	86	109	103
Karnataka	67	64	59	61	64	69
Kerala	86	85	78	79	82	93
Madhya Pradesh	79	76	82	68	88	63
Maharashtra	95	93	90	87	88	98
Orissa	95	93	90	86	91	99
Punjab	110	115	113	119	119	109
Rajasthan	104	100	92	99	80	107
Tamil Nadu	91	91	90	72	93	85
Uttar Pradesh	106	102	97	97	108	105
West Bengal	92	85	92	78	94	78
All India	98	94	93	92	98	97

Source: Calculated on the basis of data from Shukla and others 1994.

Household Investment

Parents' investment in children's education is perhaps the most powerful intervention for enhancing learning achievement, in India as elsewhere. International evidence shows that family background affects the probability that children will enroll in, attend, and complete various levels of school (Chernichovsky and Meesook 1985; Jamison and Lockheed 1987; King and Lillard 1987; Moock and Leslie 1986; Smith and Cheung 1986; Wolfe and Behrman 1984). Family background also affects children's learning while they are in school (Lockheed, Fuller, and Nyirongo 1989; Schiefelbein and Simmons 1981). Recognizing the importance of households' investments in children's education, India has embarked on strategies designed to increase demand for education as well as to improve the quality of schools, particularly for the poor.

Providing a Supportive Home Environment

Families aware of the importance of education can contribute much to their children's learning achievement, even in disadvantaged districts. Shukla and

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others (1994) found that parents' education, the family's socioeconomic status, facilities for learning at home, and support for children's education were significantly correlated with children's achievement. Children whose families provided them with textbooks scored higher on tests of arithmetic or reading comprehension in 11 of the 15 largest states (Shukla and others 1994).

Hierarchical linear modeling analyses of the DPEP baseline data by Saxena, Singh, and Gupta (1995) show that in the low-literacy districts of Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, and Tamil Nadu parents' education and father's occupation have significant positive effects on student achievement in both mathematics and language. Govinda and Varghese (1993) also found that parents' education was significantly related to student achievement. These findings underscore the importance of the intergenerational effects of education, as discussed in chapter 2.

Secondary analysis of these data for low-literacy districts found that students from families that encouraged children's schooling—allocating time at home for study, encouraging reading, and supporting their children's educational aspirations—scored significantly higher on tests of learning achievement. These effects were observed after adjustments had been made for the effects of family socioeconomic status (World Bank 1996).

Encouraging Regular Attendance

One of the most important ways families can strengthen children's learning is by sending them to school regularly. Children whose families permitted them to attend school regularly scored higher than those who attended less regularly in 9 of the 15 largest states (Shukla and others 1994). The importance of school attendance in enhancing learning achievement was also noted by Bhattacharya and Dave (1991) for grade 1 students in nine states, by Sarma, Duta, and Sarma (1991) in Jorhat District, and in a secondary analysis of the DPEP baseline data (World Bank 1996).

The positive effect of attendance on children's learning achievement points to the importance of moving rapidly toward full implementation of existing policies on compulsory education. But compulsory schooling may come at a high cost to some rural households and other low-income households that depend on their children's labor for survival (Burra 1995). Household demand for children's labor is one of the most important reasons why children drop out of school. It also probably explains irregular attendance: Jacoby and Skoufias (1995) found that children's school attendance in India was lowest during peak agricultural seasons. Strategies for offsetting the opportunity costs of child labor were discussed in chapter 3.

TABLE 4.2 HOUSEHOLD CONTRIBUTIONS TO CHILDREN'S SCHOOLING IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

State	*Average time spent on homework (hours per day)*	*Average time spent in school (days per month)*	*Share of children reading more than textbook (percent)*
Assam	2.85	10.85	40
Haryana	1.95	18.69	37
Karnataka	1.05	14.72	21
Kerala	1.95	15.72	61
Madhya Pradesh	1.94	14.28	22
Maharashtra	1.67	18.96	30
Orissa	2.68	15.93	37
Tamil Nadu	1.84	16.42	31

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

Rural households also often cannot afford the direct costs of providing other supports to education, such as reading material in the home. In 1993 only 20–40 percent of rural households in low-literacy districts in seven states provided extra reading material to children (see table 4.2). Moreover, poor children often lack both the time and the opportunity to study at home. Thus, improving school quality is particularly important for the education of the poor.

School Quality

Major research reviews have classified school inputs in a wide range of categories. The most common are curricula (what is to be taught), school spending, school inputs (physical and pedagogical, including time), teacher quality, classroom pedagogy and organization, school management, and academic climate (Fuller and Clarke 1994; Levin and Lockheed 1993; Lockheed and Verspoor 1991; Randenbush and Willms 1991). Recent analyses have also included measures of school and classroom context (Bryk, Lee, and Holland 1993).

Among researchers in India, Saxena, Singh, and Gupta (1995) divided school-level inputs into teacher quality, school resources, and school academic climate. Govinda and Varghese (1993) looked at the physical status of the school, school management, teachers, and the teaching-learning process. Shukla and others (1994) did not group the 33 school-level variables they analyzed, but those variables also fall into common categories used.

Not all school inputs are positively associated with student learning. Recent reviews of empirical research point to the effectiveness of textbooks, school libraries, teacher's education, instructional time, and frequency of homework (Fuller and Clarke 1994). Other important inputs, such as classroom processes and school management, have not been thoroughly studied internationally. And some popular inputs do not boost achievement. For example, Hanushek (1994) notes that worldwide, education systems pay for two teacher characteristics—qualifications and experience—that are seldom related to student learning achievement, while failing to pay for such highly effective inputs as textbooks.

Research on the effects of school-level inputs on student learning achievement in India is extremely limited (although recent research has looked at a random sample of schools in low-literacy districts in states joining the District Primary Education Program). Dave (forthcoming) notes that of 1,800 studies of schooling in India in 1988–92, only 54 focused on primary education, and only 8 of these examined school effects on cognitive achievement. These studies show that, although the inputs that are effective vary from state to state, and even from district to district, there are common themes.

One key observation is that the patterns of school factors associated with higher learning achievement vary by location and that the effectiveness of different inputs varies according to initial conditions (see box 4.1). The study by Shukla and others (1994) of achievement in 22 states identified about 10 statistically significant school-level determinants of learning in each state, but only two—the presence of Operation Blackboard and of parent-teacher associations—were positively associated with higher levels of learning in at least a third of the states.

Saxena, Singh, and Gupta (1995) also reported no school-level determinant of achievement that was effective in low-literacy districts in all the states surveyed. Of 19 school-level characteristics tested, only two—teachers' assignment of mathematics problems in class, and teachers' assignment of homework—were positively related to learning achievement in as many as four of the eight states surveyed. Secondary analyses of the DPEP baseline data using somewhat different model specifications identified only 4 of 63 school characteristics that were related to learning achievement in four or more states—teachers' salary, total instructional time, time spent on language, and the frequency with which teachers monitored students' progress (World Bank 1996). Several inputs were common to three states: time, physical facilities, and a school-level emphasis on academic matters. But 15 inputs were common to only two states or were unique to a single state.

The following paragraphs review education standards in India and the empirical evidence from recent studies in India on the effect of different school-level inputs on students' learning achievement related to those standards.

BOX 4.1 POLICY ANALYSIS TO HELP RAISE LEARNING ACHIEVEMENT AND REDUCE GAPS

In many countries some schools are more effective than others in *both raising the average achievement* of their students and *reducing the gap in achievement* often associated with gender and social disadvantage. Researchers at India's National Council of Educational Research and Training, the National Institute of Educational Planning and Administration, and the Department of Education have synthesized school-level factors that raise learning and reduce differences in achievement by gender, caste, tribe, and socioeconomic status (Saxena, Singh, and Gupta 1995). Using hierarchical linear modeling techniques, they have determined that differences between schools account for 20–61 percent of the variation in mathematics achievement and 14–45 percent of the variation in reading achievement in low-literacy districts. Differences between students' family backgrounds account for the rest.

This analysis of school-level factors can help shape district-level and state-level interventions to benefit girls, students from scheduled castes and tribes, and children from other disadvantaged backgrounds. Preliminary analyses indicate that the packages of interventions needed to boost learning and reduce gaps would vary according to local conditions.

PERCENTAGE OF VARIANCE IN ACHIEVEMENT ATTRIBUTABLE TO DIFFERENCES BETWEEN SCHOOLS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

State	*Mathematics*	*Reading*
Assam	48	35
Haryana	31	37
Karnataka	61	45
Kerala	20	14
Madhya Pradesh	46	45
Maharashtra	39	38
Orissa	44	29
Tamil Nadu	36	33

Standards and Curricula

Although there are no international curricula for primary education, most systems emphasize acquisition of arithmetic and language skills (reading and writing) as a core element of the curriculum. The curriculum defines the subjects to be taught and gives general guidance on the frequency and duration of instruction. Sometimes it is accompanied by a syllabus that specifies more precisely what is to be taught and what will be assessed. In most countries, and in most states in India, the curriculum is embodied in textbooks. (The readability of textbooks in India and differences among states in production costs are discussed in chapter 7.) Responsibility for curriculum development in primary education resides with the states, although the NCERT provides model materials that can be adapted at state and district levels.

To bring primary education standards into line with children's developmental capabilities, the Department of Education has established minimum levels of learning (MLL) for language, mathematics, and social and environmental studies in each of the five primary grades. The standards are expressed as competency statements for curricular domains and grade level. For example, the competency statement for "understanding whole numbers" for grade 1 is that the student can count from 1 to 20 using objects and pictures; by grade 4 the student should be able to recognize and write numerals from 1,000 to 10,000 (NCERT 1994b). Although neither states nor districts are obligated to adopt them, MLL standards have been widely disseminated, and model textbooks have been developed to support them. The standards provide a target of achievements to be attained by all students.

School Physical Inputs

The availability of basic educational inputs in India's schools has improved over the past several decades, considerably so since 1986. In 1986 the All-India Education Survey reported that 13.5 percent of schools lacked buildings, 35 percent had only one room, and 50 percent lacked drinking water (NCERT 1992b). In 1991, according to a sample survey in 22 states, "Four rooms seemed available for every five class groups" (Shukla and others 1994, p. 28), and two-thirds of schools had drinking water. A 1993 survey of schools in low-literacy districts in states entering the District Primary Education Program found that well over half of classes had classrooms, most in a *pukke* (good-quality) building, and drinking water was available in more than a third of the sampled schools in Haryana, Karnataka, Kerala, Maharashtra, and Madhya Pradesh (World Bank 1996). At the same time classrooms were crowded, physical space was limited, and other school facilities were in short supply (see table 4.3). A 1995 survey of 43 schools in 16 districts in Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh found that only 3 percent of schools lacked a building and that nearly 60 percent had drinking water (Sinha and Sinha 1995). But the availability of instructional materials in these schools remains limited.

Students in schools with better facilities often have higher levels of achievement. Govinda and Varghese (1993) found that students in schools with "good" or "very good" facilities scored twice as high in Hindi and mathematics as those in schools with "no building" or a "poor facility." Their analysis did not control for the students' family background, however, and thus did not take into account the possibility that children from poor families might be more likely to attend poorly equipped schools. Other, multivariate, analyses controlling for student background also found an effect for school facilities. For example, Shukla and others (1994) found that students in schools with more rooms per

TABLE 4.3 AVERAGE SCHOOL FACILITIES AVAILABLE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

State	*Average number of students per classroom*	*Average classroom area per student (square foot)*	*School facilities (maximum = 31)*[a]
Assam	75	0.38	8.91
Haryana	56	0.31	18.37
Karnataka	50	0.58	15.10
Kerala	41	0.43	16.15
Madhya Pradesh	45	0.17	12.89
Maharashtra	49	0.41	15.33
Orissa	36	0.12	8.68
Tamil Nadu	78	0.18	19.32

a. School facilities include maps, globes, charts, play materials and toys, games equipment, primary science kit, mini tool kit, mathematics kit, library books, school bell, musical instrument, mats and furniture for students, chairs for teachers, table for teachers, blackboard, notice board, chalk and eraser, water pitcher and glasses, dustbin, safe drinking water, toilet facilities, separate toilets for girls, electrical connection for school, playground facilities, annual medical checkup, immunization facility, and first-aid kits.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

student scored higher on arithmetic and reading comprehension tests and that students in schools with teacher facilities scored higher in reading comprehension. Saxena, Singh, and Gupta (1995) found that schools' physical facilities were important correlates of student achievement in Karnataka, Madhya Pradesh, and Orissa.

Instructional Materials

Instructional materials include the entire range of teaching tools—from chalk to computers. International experience has shown that relatively modest teaching tools such as textbooks, libraries, and classroom instructional materials are significant determinants of achievement in low-income and middle-income countries. In India most children have basic learning materials, but relatively few schools are well equipped with instructional materials (see table 4.4). For example, few schools surveyed in low-literacy districts in eight states participating in the DPEP had a complete set of the 16 instructional materials defined. In Assam, Kerala, and Madhya Pradesh, most schools had, on average, fewer

TABLE 4.4 AVERAGE NUMBER OF INSTRUCTIONAL MATERIALS AVAILABLE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

State	*Average learning materials per student (maximum = 7)*[a]	*Average instructional materials per school (maximum = 16)*[b]
Assam	6.62	6.98
Haryana	6.55	10.40
Karnataka	5.42	10.64
Kerala	6.16	9.85
Madhya Pradesh	6.11	7.87
Maharashtra	5.95	10.46
Orissa	5.75	12.28
Tamil Nadu	6.05	12.66

a. Learning materials include language textbook, math textbook, science, environmental, or social science textbook, any other book, notebooks, slate, and pencils and pens.

b. Instructional materials include blackboard, eraser, chalk, teacher's table, teacher's chair, cupboard, teacher's guides, dictionary, books apart from the children's textbooks (library), map, globe, charts, flash cards, science kit, mathematics kit, and other (unspecified).

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

than 10. The availability of instructional materials varies considerably among states, with schools in low-literacy districts in Orissa and Tamil Nadu having about twice the number of instructional materials as schools in Assam.

To correct imbalances across schools, the Ministry of Human Resource Development/Department of Education established a scheme, Operation Blackboard, to improve the instructional environment in three ways: building an additional classroom, posting an additional teacher, and providing a package of teaching materials to the school. Schools participating in Operation Blackboard in low-literacy districts showed higher mathematics achievement in Kerala and Madhya Pradesh and higher language achievement in Assam and Madhya Pradesh than nonparticipating schools (Saxena, Singh, and Gupta 1995). In other states no difference in achievement was found between participating and nonparticipating schools, again showing how variations in conditions can determine the effectiveness of an intervention.

The most commonly available instructional material is the textbook. In most states most primary-level children have textbooks. As chapter 7 will show, some states heavily subsidize the cost of textbooks to parents, while others do not. Most states provide textbooks at no cost to girls and to students from scheduled castes and tribes. Saxena, Singh, and Gupta (1995) found that free textbook provision was positively related to achievement in Madhya Pradesh.

Govinda and Varghese (1993) found that children in schools where all students had textbooks scored two to three times higher than children in schools where only some (or none) had textbooks. They observe that this difference "clearly highlights the essentiality of textbooks for each child to improve the quality of classroom teaching and making it more effective in terms of learning outcomes" (p. 248). Research on the effectiveness of other instructional materials in India is limited. Shukla and others (1994) include only a few school indicators of instructional materials, none of which was correlated with learning achievement.

Teacher Quality

Indian experience and international research confirm that proxies for teacher quality—such as type of certification, pre-service education, or salary—typically are not related to student learning achievement (Hanushek 1994; Kingdon 1996). In India teacher compensation does not appear to be a major problem. What really matters is the teacher's knowledge of the subject (Fuller and Clarke 1994). Despite the relatively high level of teachers' formal pre-service education in India, many teachers lack a strong foundation in the subject they teach. For example, in Tamil Nadu only half of grade 4 teachers who were tested could correctly answer 80 percent of the questions on a test of grade 4 mathematics knowledge (Bashir 1994).

Improving teachers' knowledge is likely to improve student learning outcomes and may need to be a focus of future research. Many states have increased the pre-training education requirements for primary teachers, and the government of India has sought to strengthen the foundation of teachers' subject matter knowledge by increasing in-service training through district institutes for education and training (DIETs).

Teachers' experience has not been found to be an important predictor of student achievement in the major empirical studies (Shukla and others 1994; Saxena, Singh, and Gupta 1995). Indeed, Saxena, Singh, and Gupta (1995) found that teachers' experience was negatively correlated with student achievement, in some cases significantly so.

Teachers' education, however, particularly the number of years of pre-training general education, are related to student achievement. Saxena, Singh, and Gupta (1995) found that teachers' average number of years of education was positively related to achievement in Assam and Tamil Nadu. And Govinda and Varghese (1993) found that teachers' educational attainment was a significant predictor of student achievement in both advantaged and disadvantaged regions.

Teachers' qualifications, particularly pre-service teacher training, are not significantly related to learning achievement. Shukla and others (1994) found that the percentage of untrained teachers was positively related to student reading comprehension in three states and negatively related in four states, while for arithmetic achievement, it was positively related in four states and negatively related in three states. The proportion of teachers with no teacher training was not related to achievement in low-literacy districts in six of eight DPEP states (World Bank 1996).

Where examined, in-service teacher training was not found to relate to student learning achievement. This may be due to the nature of the training and its typical duration. Issues related to teachers and their preparation are taken up further in chapter 6.

Teaching Practices

Better teaching leads to better learning. In general, teaching methods that emphasize more active teaching and learning engage students more fully than those that emphasize rote learning. As results from the DPEP baseline studies show, students whose teachers monitor their progress and give them feedback learn more than those whose teachers pay no attention to how well they are doing.

Saxena, Singh, and Gupta (1995) found strong positive associations between teaching practices and student achievement. Practices positively associated with student learning include assigning mathematics problems to solve in class (for mathematics achievement), assigning reading and dictation (for language achievement), providing testing and feedback, and assigning homework. Govinda and Varghese (1993) found that in schools where students had higher levels of academic achievement, teachers explained new concepts with frequent use of blackboards, motivated students to participate in classroom activities by asking questions, provided students opportunity to practice through class work, assigned and corrected homework, and reviewed the previous lesson before proceeding. Secondary analysis of results from the DPEP baseline surveys in low-literacy districts found that higher achievement was associated with frequent monitoring of student progress, student learning in small groups, and frequent homework assignments (World Bank 1996).

Opportunity to Learn

The most consistently significant school-level characteristics are related to the opportunity to learn. Schools must operate regularly, and teachers must come to school, teach, and cover the curriculum. In countries around the world the amount of time devoted to learning is consistently related to achievement (Stevenson and Baker 1991).

Secondary analysis of the DPEP baseline data confirms the fundamental principle that the most important input a school can provide to students is the opportunity to learn (World Bank 1996). Student achievement in low-literacy districts in India was higher in schools with more total instructional time and more instructional time on the subjects tested. It was higher for children who attended school regularly and who did schoolwork at home, both of which increase the amount of time spent learning. It also was higher in schools with higher rates of teacher attendance. Teacher absenteeism, widely reported in a number of states, reduces instructional time and, consequently, achievement.

Also important is the amount of time the teacher is able to spend with each student, which is often determined by the size of the class. Classes often are crowded in urban areas but underpopulated in rural areas (Govinda and Varghese 1993). Not surprisingly, differences in the student-teacher ratio in low-literacy, typically rural, districts were only slightly related to learning achievement.

The School's Academic Climate

Schools that care about what children learn are more effective than those that do not. Although it is difficult to quantify "academic climate," Saxena, Singh, and Gupta (1995) included indicators of teachers' commitment, parents' involvement, and the head teacher's leadership in their analysis of the DPEP baseline data. Although the variables are poorly measured in this data set, the authors concluded that attention to teaching and learning in the classroom by students, teachers, and parents matters. Teachers' commitment—coming to class regularly and providing special help to students--was positively related to mathematics achievement in Maharashtra and to language achievement in Haryana, Madhya Pradesh, and Maharashtra. Parental involvement was related to student achievement in Kerala, and the head teacher's leadership was related to mathematics achievement in Assam.

Secondary analysis of the DPEP baseline data shows that other indicators of academic climate—for example, emphasis on instructional improvement and instructional supervision—also have positive effects on student achievement (World Bank 1996). Shukla and others (1994), who looked only at the presence of a parent-teacher association as an indicator of school climate, found that it was positively related to arithmetic achievement in eight states and to reading comprehension in six states. Planned studies involving school and classroom observations may shed more light on the effect of academic climate in India.

School Policies and Management

The school management indicator studied most in India is the classification of schools by type: fully private, government-aided private, or government. Govinda and Varghese (1993) characterize the three types according to the autonomy of schools:

> The internal management system and the place of a headmaster in a private unaided school is mainly characterized by the autonomy enjoyed by the headmaster with full support and active participation from the Management Committee. The private-aided schools represent a combination of control and autonomy wherein the Department [of Education] provides financial support and prescribes certain norms of operation; yet, in the internal management of the system the headmaster and the Management Committee enjoy complete autonomy. In contrast to these, the situation prevalent in Government schools can be characterized as a state of total laissez-faire. In this case, neither the Department monitors the school activities effectively nor is there any internal arrangement for monitoring such as a management committee. As well, most of the Government schools do not have an officially designated headmaster to manage the school activities. (pp. 81–82)

Four recent empirical studies of the effect of school type on student achievement found that, other things being equal, students at fully private and government-aided private schools had higher achievement than students at government schools in Madhya Pradesh, Tamil Nadu, and Uttar Pradesh (Bashir 1994; Govinda and Varghese 1993; Kingdon 1994; and Varghese 1995). School management issues are taken up further in chapter 8.

School and Class Context

Peer group effects are significant in all schools. Shukla and others (1994) found that the proportion of students from scheduled castes and tribes in a school was negatively related to achievement in 10 states. Analyzing the DPEP baseline data, however, Saxena, Singh, and Gupta (1995) found that the proportion of such students was meaningfully related to achievement in mathematics and language only in Kerala, where the effect was positive. By contrast, they found that the average socioeconomic status of students in a school was significantly related to mathematics achievement in Kerala, Madhya Pradesh, Maharashtra, and Orissa and to language achievement in Karnataka, Madhya Pradesh, and Maharashtra.

Other State Interventions

States have introduced a variety of schemes to improve schools' attractiveness to children: midday meals, free uniforms, free textbooks, and attendance and other scholarships. Examining the impact of these schemes on learning achievement in low-literacy districts in eight states, Saxena, Singh, and Gupta (1995) found few statistically significant effects, either positive or negative (6 out of a possible 72 effects). Free textbooks raised mathematics and reading achievement slightly in Madhya Pradesh, attendance scholarships boosted mathematics and language achievement in Kerala and language achievement in Assam, and midday meals boosted language achievement in Madhya Pradesh. Because the purpose of such interventions was principally to encourage participation (enrollment and attendance), their small effect on learning for children already in school should not be seen as cause for criticism.

Cost-Effectiveness Analysis as a Guide for Local Investments

As the previous section has shown, although school inputs boost achievement everywhere, the interventions that matter vary widely across states and districts. Enabling states, districts, and even schools to find their own solutions to common problems is therefore essential. The government of India has embarked on a program—the DPEP—for improving primary education that will encourage districts and states to select for themselves the interventions appropriate for local conditions. To make such decisions, they will need to know the cost and the effectiveness of different interventions. Cost-effectiveness analysis can be used to compare certain types of inputs, although for others the cost information needed to make such comparisons is lacking.

The cost-effectiveness analysis that follows draws from education production function analyses, based on hierarchical linear modeling, carried out in low-literacy districts in eight states (World Bank 1996). For each state, the analyses examined determinants of average school achievement in mathematics and language. Although the models included random effects for students' gender and socioeconomic, caste, and tribal status, these are not discussed in the cost-effectiveness analysis of school inputs.

Inputs were grouped into six clusters of related variables: school and class context, teacher quantity and quality, teaching practices, academic emphasis, school physical and fiscal resources, and school policies and management. In all, 63 school-level variables were explored for their effects on achievement.[6]

In this cost-effectiveness analysis the indicator of effectiveness is the "effect size," measured in standard deviation units (see box 4.2). This indicator permits the aggregation of information from studies using different units for measuring the dependent variable. This was the case in the DPEP baseline surveys, which used four different measures of outcomes.

The costs of inputs are expressed as unit costs (costs per student) estimated from state-specific cost studies in Haryana and Maharashtra (Sharma, Ramakrishnan, and Seth 1995c, 1995d) and state and district DPEP project

BOX 4.2 THE EFFECT SIZE

The effect size is a convenient way of comparing the impact of different interventions as well as of summarizing effects from multiple studies (Cohen 1969; Glass, McGaw, and Smith 1981). In experimental studies the effect size is defined as the difference between the mean of the experimental group (for example, the textbook group) and the mean of the control group (for example, the nontextbook group) divided by the standard deviation of the control group. In nonexperimental studies the effect size is the difference in means between two groups (for example, males and females) divided by the pooled standard deviation. The effect size is also useful when comparing the effects of interventions on learning achievement across a variety of studies in which the outcome indicators of learning were measured by different tests. An effect size of 0.25 or more (25 percent of a standard deviation) is considered meaningful, and an effect size greater than 3 is highly unlikely.

appraisal reports. For inputs expected to last longer than a year, amortized annualized costs are presented.

These cost and effectiveness measures are then used to compare the cost-effectiveness of inputs to education. At the student level, the effect of an incremental 1 rupee (Re) per child is estimated. Thus, each input is evaluated for the effect size that could be expected for each rupee spent on the input. For infrastructure, the effect of an incremental Rs100 per child is estimated, and for quality-enhancing inputs, the effect of an incremental Rs10 per child is estimated. Since the DPEP baseline studies were not designed specifically for a cost-effectiveness analysis, certain assumptions had to be made about these inputs. To make the exercise more meaningful, alternative scenarios using different assumptions are presented wherever possible. These cost-effectiveness estimates depend on the assumptions about costs, which would need to be refined to provide policy guidance. Moreover, they are meaningful only for modest increments around the mean level of expenditure per child.

Broad generalizations across states about the most cost-effective inputs should be undertaken with great caution. In this analysis such generalizations are made only for inputs that show an effect on achievement for multiple states, to show how similar analyses could be used at a local level to guide investment decisions. The number of data sets in which each input was found to be significantly related to learning achievement is indicated in each of the tables in this section; the maximum number of data sets is 16 (eight states and two achievement models in each state, one for language and one for mathematics). The analyses are illustrative only.

Demand-Side Interventions

As this chapter has shown, household investment in children's education is strongly and positively related to achievement. A comparison of the average effect size of different household interventions shows that the presence of reading materials (other than the school textbook) in the home boosts learning achievement about 3 times more than an additional hour of homework and about 11 times more than an additional day of school attendance per month (see table 4.5).

For the unit cost of a child's time the analysis used the opportunity cost, and for extra reading materials it used the direct costs. The opportunity cost of a child's time is based on the most recent data on the hourly wage rate for unskilled labor, which in 1993 was Rs1.64 an hour or Rs13 a day. This may underestimate the actual opportunity cost of a child's time if the child's labor at home enables a parent to work outside the home at a higher hourly or daily rate. The cost per child of reading materials was estimated for three types of materials: a local daily newspaper (Re1) shared among five family members (Rs60 per person a year), a local weekly newspaper (Re1) shared among five family members (Rs8.55 per person a year), and a set of four used textbooks for the child (Rs4 each, or Rs16 a year). These costs are illustrative only.

TABLE 4.5 COST-EFFECTIVENESS OF SELECTED HOUSEHOLD INPUTS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

Input[a]	*Number of data sets*	*Average effect size*[b]	*Unit cost (rupees)*	*Effect per Re1*
One additional hour of homework a day	14	0.053	1.64	0.032
One additional day of school a month	15	0.013	13.10	0.001
Reading more than textbooks (a year)	16			
Children's section of daily newspaper every day		0.145	60.03	0.002
Children's section of daily newspaper once a week		0.145	8.55	0.017
An extra book for every school subject		0.145	16.00	0.009

a. For each input the cost-effectiveness exercise has aggregated effects only across states for which the variable appeared in the model. The number of such data sets is presented in the first column of the table.

b. Based on full model for language and mathematics for eight states.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

At the household level, spending one extra rupee for any of these inputs would have almost no effect on achievement. But if the household could spend Rs10 to allow a child to study about 1.5 extra hours a day all week, achievement could grow by as much as a third of a standard deviation. Since children in most states already spend an average of one to two hours a day on schoolwork at home (table 4.2), however, the average child is unlikely to be able to increase the time spent on homework. But students spending less time than average could spend more.

Supply-Side Interventions

The cost-effectiveness analysis looked at several inputs on the supply side: physical inputs, instructional materials, teachers' quality, and opportunity to learn.

PHYSICAL INPUTS. Research has shown that physical facilities, which vary widely in India, affect learning achievement in the country. The cost-effectiveness analysis compared two physical inputs: (a) a package of inputs and (b) the amount of classroom floor space per student (an indicator of a school's physical capacity). Costs are based on expected expenditures on materials, equipment, and construction activity as reported in state and district project appraisal reports. The package of facilities would cost Rs125 per child a year, whereas an additional foot of floor space would cost about Rs38 per child a year (see table 4.6). Of the two inputs, adding floor space—and thus reducing

TABLE 4.6 COST-EFFECTIVENESS OF SCHOOL PHYSICAL FACILITIES IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

Input	*Number of data sets*	*Average effect size*[a]	*Unit cost (rupees)*	*Effect per Rs100*
Full package of facilities[b]	7	0.108	125.00	0.12
One additional square foot per pupil	7			
Cost based on DPEP average		0.064	37.88	0.17
Cost based on school construction in Uttar Pradesh		0.064	15.00	0.43

a. Based on full model for language and mathematics for eight states. For each input the cost-effectiveness exercise has aggregated only across states for which the variable appeared in the model.

b. See notes to table 4.3 for definition.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

crowding or providing a classroom where instruction can continue in inclement weather—is more cost-effective than supplying the full package of facilities: while each Rs100 spent on classroom construction would yield 17 percent of a standard deviation of achievement, each Rs100 for facilities would yield 12 percent of a standard deviation of achievement. Increasing the floor space per student from less than 1 square foot (the mean across schools is less than half a square foot per student) to 8 square feet (the norm in India) would boost learning achievement by nearly 24 percent of a standard deviation. Lower-cost construction could be even more cost-effective.

INSTRUCTIONAL MATERIALS. The cost-effectiveness analysis compared two packages of classroom instructional materials: instructional materials and aids (see notes to table 4.7) and two aspects of Operation Blackboard. Because the DPEP baseline questionnaire asked only whether a school was "covered by Operation Blackboard," with no details about what part of the package had been received, two assumptions were used: that Operation Blackboard provided only equipment and that it provided both equipment and an extra teacher.

The results show that the package of instructional materials and aids boosts learning 14 percent of a standard deviation per Rs10, while Operation Black-

TABLE 4.7 COST-EFFECTIVENESS OF INSTRUCTIONAL MATERIALS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

Input	*Number of data sets*	*Average effect size*[a]	*Unit cost (rupees)*	*Effect per Rs10*
Complete package of instructional materials and aids[b]	5	0.24	17.03	0.14
Coverage under Operation Blackboard[c]	10			
Equipment only		0.024	6.25	0.04
Equipment and teacher		0.024	392.36	0.0006

a. Based on full model for language and mathematics for eight states. For each input the cost-effectiveness exercise aggregated only across states for which the variable appeared in the model.

b. Instructional materials and aids include blackboard, eraser, chalk, table for teacher, chair for teacher, cupboard, teacher's guide, dictionary, books apart from children's textbooks or library, maps, globe, charts, flash cards, science kit, and mathematics kit. Costs are expected expenditures as reported in state and district appraisal reports.

c. Operation Blackboard items include maps, globe, educational charts, play materials, games and toys, games equipment, primary science kit, mini tool kit, mathematics kit, books for library, musical instruments, classroom equipment, and water facility. Costs are of items actually found in sampled schools and average teacher salary.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

board equipment boosts learning 4 percent of a standard deviation per Rs10 (table 4.7). The Operation Blackboard package is substantially less cost-effective when it includes an additional teacher. Because of considerable overlap in the materials provided by Operation Blackboard and the package of instructional materials, the actual impact and cost-effectiveness of the Operation Blackboard materials may be higher than estimated.

TEACHER QUALITY. The cost-effectiveness of several strategies that could be used to improve teachers' quality in India was calculated, including increasing teachers' salaries, increasing teachers' in-service training, and increasing pre-service education qualifications.

Increments in teachers' salaries, net of education and experience, are positively related to student achievement in seven data sets, but the effects are quite modest: the average effect size for increasing the average teacher salary by Rs100 a month per school is less than 1 percent of a standard deviation (see table 4.8). The high absenteeism among teachers in many rural schools suggests that salaries may not be adequately administered to serve as incentives. Research is needed on strategies for using teachers' salaries more effectively as incentives, such as by linking the receipt of salaries to evidence of attendance.

In-service training as presently offered in low-literacy districts of India also has little effect on student learning. This is not surprising, as most teachers have received only one or two days of in-service training over their professional careers, most in the form of reviews of administrative directives. Professionally designed, well-executed in-service training that focuses on improving the quality of teaching in the classroom could be expected to have a greater effect (see chapter 6).

Raising teachers' pre-service education from 10 years to 12 has a positive effect on student learning. And because the costs of pre-service teacher education are amortized across several years, increasing the number of teachers with 12 years of pre-service general education is also cost-effective. How the cost-effectiveness is computed depends on the assumptions underlying the costs. Costs would be incurred, for example, for expanding secondary education from 10 years to 12 to accommodate the pre-service teacher cohort, for adding a required subject to the core subjects for grades 11–12, and for hiring teachers with higher qualifications (and thus paying higher salaries).

The effects of adding to each school one teacher with 12 years of education and one teacher with 12 years of mathematics education were calculated separately.[7] The costs of adding a teacher with 12 years of education, including 10 years of mathematics, are higher than those for adding a teacher with 12 years of mathematics education because the capacity of the secondary system would need to be increased to accommodate the additional students at grades 11–12 (both the capital and the recurrent costs for such an expansion are included in

TABLE 4.8 COST-EFFECTIVENESS OF INCREASING TEACHER QUALITY IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

Input	*Number of data sets*	*Average effect size*[a]	*Unit cost (rupees)*	*Effect per Rs10*
Increasing the average teacher salary by Rs100 a month per school	7	0.003	3.00	0.01
Increasing the average days of in-service training per school by one day	4	0.00005	0.57	0.001
Increasing the number of teachers with 12 years of education by one teacher per school	6			
Only additional recurrent expenditures required for additional students at the secondary level		0.11	0.77	1.43
Both additional capital and recurrent expenditures required for additional students at the secondary level		0.11	1.54	0.71
Plus annual salary increment		0.11	81.54	0.01
Increasing the number of teachers with 12 years of mathematics by one teacher per school	6			
Recurrent expenditure on two years of schooling with mathematics as an extra core subject required at the secondary level		0.135	0.53	2.55
Both capital and recurrent expenditure on two years of schooling with mathematics as an extra core subject required at the secondary level		0.135	1.34	1.01
Plus annual salary increment		0.135	81.34	0.02

a. Based on full model for language and mathematics for eight states. For each input the cost-effectiveness exercise has aggregated only across states for which the variable appeared in the model.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

the calculation). Because including mathematics as a required subject in grades 11–12 would not entail a similar expansion of the secondary system, the unit costs would be lower.

Teachers with 12 years of pre-service general education would be paid on a higher scale (an estimated Rs3,000 a month) than teachers with less education. Thus, the total annual cost per student both for increasing the required pre-service education to 12 years and for adding mathematics as a required course would be about Rs81. Spending Rs10 per student to buy one additional teacher with 12 years of pre-service education could be expected to boost learning achievement in the school by up to 1.4 standard deviations, while adding mathematics as a core subject for teachers could boost learning achievement by up to 2.55 standard deviations for each Rs10 spent. Including the cost of the annual salary increment that could be expected sharply reduces the cost-effectiveness. Moreover, this analysis does not consider the opportunity costs incurred when a person with 12 years of mathematics education becomes a teacher rather than pursuing a different occupation.

OPPORTUNITY TO LEARN. Time for learning is a key input, but estimating the cost-effectiveness of strategies for increasing students' contact time with teachers is difficult. Four strategies were evaluated: lowering the student-teacher ratio, increasing the school year by one day, increasing the instructional time per year by one hour, and increasing the amount of instructional time spent on language.

Reducing the student-teacher ratio (three ways: by 1 student, to 40 students, and to 35 students) has a very modest effect on learning achievement in all cases (see table 4.9). Thus spending Rs10 per student to reduce the class size in rural schools would not be an efficient means of raising achievement.

TABLE 4.9 COST-EFFECTIVENESS OF INCREASING THE OPPORTUNITY TO LEARN IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

Input	*Number of data sets*	*Average effect size*[a]	*Unit cost (rupees)*	*Effect per Rs10*
Reducing the student-teacher ratio	5			
By 1		0.00375	26.66	0.001
To 40:1		0.0335	287.28	0.0002
To 35:1		0.0523	511.84	0.001
Adding one additional school day per academic year	10	0.006	6.63	0.01
Adding one additional teaching hour per academic year	7	0.0005	0.84	0.006
Adding one additional hour of language instruction per academic week	8	0.02	0.7	0.29

a. Based on full model for language and mathematics for eight states. For each input the cost-effectiveness exercise aggregated only across states for which the variable appeared in the model.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

The average effect size of adding one more day to the school year is small, and the cost per student (Rs6.63) substantial, so the cost-effectiveness of lengthening the school year is minuscule. The effect on achievement of adding an hour of instruction is also small, and the cost-effectiveness even smaller than that of lengthening the school year.

The average effect size for reallocating time from other subjects to increase the amount of language instruction per academic week is also small (2 percent of a standard deviation). But the effect for 40 weeks—the typical school year—would be 80 percent of a standard deviation. Because the cost is also minimal, this intervention is the most cost-effective of those examined.

Cost-Effective Packages of Interventions

Although introducing a single new input in a school can improve learning, a more effective strategy is to introduce a package of inputs that systematically changes the school. Box 4.3 shows how a carefully selected package of interventions might improve learning achievement in low-literacy districts in one state in India.

Conclusions

Research in India and around the world has shown that both home and school investments are important in enhancing children's learning. This synthesis of the research in India suggests that some home and school inputs are more effective than others, while some are more cost-effective.

Demand-side interventions may be needed to encourage the regular attendance of children in school. One possible approach is to enforce compulsory attendance laws in states where enrollment rates are higher. Another is to create demand for attendance, through midday meal programs or attendance scholarships. Researchers have found that the midday meal program has positive effects on learning achievement in Madhya Pradesh, and attendance scholarships have been effective in Kerala. Although more research is needed to assess the effects of these benefits and more selective targeting may be necessary to improve their cost-effectiveness, these strategies could help poor families meet the costs of schooling.

Supply-side (school-level) interventions to increase instructional time, provide a physical facility for learning, and ensure that students and teachers have appropriate instructional materials deserve the highest priority in developing strategies to raise learning achievement. Cost-effectiveness analysis suggests that providing physical facilities where none exist, offering a basic package of instructional materials, hiring better-educated teachers, and providing more

BOX 4.3 COST-EFFECTIVE INTERVENTIONS IN ASSAM

In low-literacy districts in Assam the average arithmetic achievement of the top 25 percent of schools is 2 standard deviations above that of the bottom 25 percent of schools. Hierarchical linear modeling (HLM) analyses have identified eight characteristics of schools with the potential for changing "bottom" schools into "top" schools; taken together, these characteristics could boost learning achievement in mathematics by 40 percent of a standard deviation. These could be high-priority areas for improving schools in low-literacy districts in Assam, although more would be required to close the gap entirely.

Hierarchical linear modeling analyses can be used to inform choices. For example, the average teaching time in top schools is 66.7 hours a year more than the average teaching time in bottom schools. Hierarchical linear modeling analyses show that if teaching time in bottom schools could be raised to the level of that in top schools, average student achievement could be expected to rise by 6.7 percent of a standard deviation.

DIFFERENCES BETWEEN TOP AND BOTTOM SCHOOLS IN LOW-LITERACY DISTRICTS IN ASSAM ON EIGHT SCHOOL CHARACTERISTICS SIGNIFICANTLY RELATED TO ARITHMETIC ACHIEVEMENT (Z-SCORES)

School characteristic	*Difference in means between top and bottom 25 percent of schools*	*Regression coefficient in final HLM model (mathematics)*	*Learning achievement gained by raising bottom schools to the level of top schools*
Teacher salary (rupees)	523.6	0.001	0.052
Daily teacher time lecturing (minutes)	6.7	0.007	0.047
Student working time in small groups (minutes)	7.2	0.011	0.079
Percentage of teachers using textbooks	0.024	1.346	0.032
Total teaching time in school year (hours)	66.7	0.001	0.067
Weekly teaching time on language (hours)	0.7	0.101	0.071
Average teacher attendance (rating)	0.2	0.267	0.053
School physical facilities (number)	1.6	0.025	0.04
Total effect	n.a.	n.a.	0.405

n.a. Not applicable.

Note: The learning achievement variable is standardized with a mean of 0 and a standard deviation of 1. The top 25 percent of schools ($n = 39$) and the bottom 25 percent of schools ($n = 40$) in Assam were identified in terms of arithmetic achievement. The analysis controlled for eight student background characteristics based on the empirical Bayes residual associated with the intercept (school mean arithmetic achievement adjusted for student background variable). The empirical Bayes residual is provided by the residual file associated with the unconditional model for arithmetic achievement. Other characteristics of schools, even those related to higher levels of learning, did not differentiate top schools from bottom schools and thus would be lower priorities for investment.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

instructional time are appropriate supply-side interventions. Since teachers' attendance is a strong predictor of students' learning, strategies that more closely link teachers' salaries to their work performance could also be considered. The new *panchayati raj* institutions could play a role in such strategies.

Considerable variation across states, districts, and schools, however, means that packages of interventions identified locally to meet the needs of specific schools are more likely to be cost-effective than uniform packages. What is effective in a state with a higher level of educational development may differ from what is effective in a state with a lower level of development. Recognizing this, the government of India and the states have established the DPEP to support the local development of primary education.

CHAPTER FIVE

Reducing Gaps in Enrollment, Retention, and Achievement

The National Policy on Education (as updated in 1992) and the 1992 Program of Action, which provide the basic policy framework for education in India, emphasize rectifying historical inequities. This emphasis is reflected in the objectives for primary education. In order of priority, these are to reduce dropout rates, improve learning achievement, and expand access for unserved students. Girls and students from scheduled castes and scheduled tribes are to receive priority attention. The national policy acknowledges past disadvantage due to gender and caste and tribal affiliation and sets in motion the means for rectifying this disadvantage.

At least implicitly then, India's national education policy recognizes the existence of gaps, defined as differences between two groups with respect to some indicator. For education, the indicators of interest are enrollment, attendance, retention, and learning achievement. This chapter focuses on three important gaps in education in India: the gender gap, the poverty gap, and the caste and tribal gap. In this chapter a negative value for a gap means that the indicator for the target group—girls, the poor, or scheduled caste or scheduled tribe students—is lower than the same indicator for the reference group: boys, the economically advantaged, or students from nonscheduled castes or tribes. A positive value means the opposite.

International evidence shows that education gaps narrow for two principal reasons: enrollment gaps close as the education system expands to provide access to all, and achievement gaps (including differences in attendance and retention) close when the education system targets interventions selectively. In India the gender gap is due mostly to cultural and economic constraints and could be reduced through awareness campaigns, child-care centers, direct incentives, and the hiring of more female teachers. Because the caste gap is due largely to poverty, welfare-based interventions targeting scheduled caste students without regard to household welfare may be more efficiently directed at the poor, regardless of caste status. To close the tribal gap, which stems from a complex combination of economic and cultural factors, non-welfare-based interventions focusing on cultural factors will continue to be appropriate.

Significant Poverty Gap

According to the 1995–96 Government Economic Survey, 19 percent of the population in India lived below the poverty line in 1993–94. Because poverty affects whether children enroll in school, whether they stay in school, and how much they learn, children from the poorest households are educationally disadvantaged compared with those from wealthier households. Poverty also exacerbates gender gaps in school participation within households and largely explains education gaps related to caste and tribal status. National education policy in India recognizes the effects of poverty on school participation, and both centrally sponsored schemes, such as free midday meal programs and Operation Blackboard, and state-sponsored programs of incentives are intended to mitigate these effects.

Lower Literacy and Fewer Years of Schooling among the Poor

Literacy rates are significantly lower in the lowest income quintile than in the highest, in both rural and urban areas, with the effects of income on schooling more pronounced for females than for males (see table 5.1). And individuals in the lowest quintile complete significantly fewer years of schooling than those in the highest quintile. For example, rural females in the lowest income quintile had completed only about half a year of schooling, while rural females in the highest quintile had completed more than two years.

Lower Enrollment and Higher Dropout Rates among the Poor

Children of poor families are less likely to be enrolled in school than children of better-off families. In 15 states surveyed by the National Council of Applied Economic Research (NCAER) the poverty gap in enrollment is 25 percentage points (NCAER 1994). That is, the enrollment rate for children in the poorest

TABLE 5.1 LITERACY AND YEARS OF SCHOOLING IN HIGHEST AND LOWEST INCOME QUINTILES, INDIA, 1987

	Literacy rate (percent)		*Mean years of schooling*	
Group	*Lowest quintile*	*Highest quintile*	*Lowest quintile*	*Highest quintile*
Rural males	47	61	1.7	3.7
Rural females	24	47	0.5	2.3
Urban males	59	90	2.6	8.8
Urban females	41	86	1.5	7.5

Source: Upendranadh 1993.

households (those with annual incomes of less than Rs3,000 per capita) is on average 25 percentage points lower than it is for children in the wealthiest households (with annual incomes of more than Rs10,000 per capita). In six states (Andhra Pradesh, Bihar, Karnataka, Madhya Pradesh, Orissa, and Rajasthan) more than 20 percent of children in the poorest households are not enrolled in school, whereas in 10 of the 15 surveyed states fewer than 1 percent of children in the wealthiest households are not enrolled. In the five other states the nonenrollment rate for the wealthiest is less than 5 percent in all but Bihar and Rajasthan. The poverty gap in enrollment is larger in rural than in urban areas (see table 5.2).

Children of poor households also are more likely to drop out of school. The dropout rate for these children was on average four times higher than it was for children from more affluent households in 1992–93 (NCAER 1994). This gap too is larger in rural areas than in urban areas.

Surveying households to find out why students drop out, the NCAER study found that in all 15 states lack of finance was the most important reason, mentioned by more than 50 percent of sampled households in 12 states. Financial security, as indicated by parents' landholdings and occupation, affects both enrollment and dropout rates (see table 5.3). For every state except Kerala enrollment rates are lower—and for every state except Bihar and Haryana dropout rates are higher—for the group with lower financial security.

Lower Learning Achievement among the Poor

Children from poor households score lower on achievement tests than do children from wealthier households. In all states achievement was higher for children with a higher socioeconomic status, with parental education and occupation having stronger effects on language achievement than on arithmetic achievement—a finding consistent with international evidence.[1] The gap in

TABLE 5.2 POVERTY GAP IN ENROLLMENT AND DROPOUT RATES AMONG CHILDREN AGES 6–14, BY AREA, 15 MAJOR INDIAN STATES, 1992–93

(percentage points)

	Enrollment rate[a]			*Dropout rate*[b]		
State	*All areas*	*Rural areas*	*Urban areas*	*All areas*	*Rural areas*	*Urban areas*
Andhra Pradesh	–27	–32	–17	14	15	13
Assam	–15	–15	0	16	16	12
Bihar	–27	–25	–17	11	11	10
Gujarat	–5	–5	–5	7	8	5
Haryana	–1	0	–7	3	3	3
Karnataka	–22	–25	–14	11	9	7
Kerala	0	0	0	0	0	0
Madhya Pradesh	–27	–24	–13	6	5	4
Maharashtra	–9	–12	0	10	12	3
Orissa	–18	–18	–9	8	9	—
Punjab	–55	–5	–8	–12	0	–14
Rajasthan	–32	–33	–10	3	2	—
Tamil Nadu	–5	–6	0	8	9	7
Uttar Pradesh	—	—	—	—	—	—
West Bengal	–28	–23	–7	15	17	0
All India	–25	–17	–8	7	8	–4

— Not available.

Note: Gap between children from households with per capita incomes of less than Rs3,000 and for children from households with per capita incomes of more than Rs10,000.

a. The enrollment rate is the number of children ever enrolled per hundred children in the age group 6–14.

b. The dropout rate is the average annual discontinuation rate of elementary-school-age children (percentage of ever-enrolled children who discontinued at any time in the age bracket 6–14).

Source: NCAER 1994, tables 3.1–3.3 and 4.1–4.3.

achievement between children from the highest and lowest quartiles of socioeconomic status is, on average, about one-third of a standard deviation (see table 5.4).

High Cost of Schooling as the Main Cause of the Poverty Gap

In much of rural India parents cannot afford the direct and indirect costs of sending their children to school. Empirical evidence on these costs is limited

TABLE 5.3 POVERTY GAP IN ENROLLMENT AND DROPOUT RATES AMONG CHILDREN AGES 6–14, BY PARENTS' LANDHOLDING AND OCCUPATIONAL STATUS, 15 MAJOR INDIAN STATES, 1994

(percentage points)

	Landholding status		*Occupational status*	
State	*Enrollment rate*[a]	*Dropout rate*[b]	*Enrollment rate*[a]	*Dropout rate*[b]
Andhra Pradesh	–7	10	–20	16
Assam[c]	–35	5	–47	10
Bihar	–30	–1	–42	3
Gujarat	–8	5	–20	12
Haryana	–23	0	–26	2
Karnataka	–13	2	–21	7
Kerala	1	3	2	3
Madhya Pradesh	–16	3	–35	6
Maharashtra	–12	2	–18	7
Orissa	–26	7	–34	10
Punjab	–19	2	–17	3
Rajasthan	–21	2	–39	4
Tamil Nadu	–6	4	–13	11
Uttar Pradesh	–27	1	–13	2
West Bengal	–24	3	–27	8
Average	–18	3	–25	7

Note: Gap between children of landless wage earners and landowners and children of salaried professionals and wage earners.

a. The number of children ever enrolled per hundred children in the age group 6–14.

b. The average annual discontinuation rate of elementary-school-age children (percentage of ever-enrolled children who discontinued at any time in the age bracket 6–14).

c. Average for northeastern region.

Source: NCAER 1994.

and inconsistent. A study by NCAER (1994) estimates the average private costs per child to include Rs246 a year for textbooks, Rs36 for private coaching, and Rs11 for transport. In Haryana and Maharashtra, Sharma, Ramakrishnan, and Seth (1995c, 1995d) found additional costs for uniforms (Rs76 and Rs42, respectively) and stationery (Rs10 and Rs9), but lower costs for textbooks (Rs35 and Rs16). The indirect costs of schooling—the opportunity cost of the child's labor—are estimated at Rs13 a day. Not counting the forgone labor, a household could spend up to Rs400 a year to send a child to school.

TABLE 5.4 POVERTY GAP IN ACHIEVEMENT AMONG GRADE 4 AND 5 STUDENTS BY SOCIOECONOMIC STATUS (SES) QUARTILE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percentage of standard deviation)

	Arithmetic			*Language*		
State	*SES1 –SES4*	*SES2 –SES4*	*SES3 –SES4*	*SES1 –SES4*	*SES2 –SES4*	*SES3 –SES4*
Assam	–28	–46	–28	–23	–41	–12
Haryana	–24	–13	–12	–13	–16	–14
Karnataka	–49	–30	–26	–53	–34	–30
Kerala	–43	–38	–18	–59	–40	–15
Madhya Pradesh	–22	–21	–15	–17	–20	–14
Maharashtra	–32	–19	–13	–49	–31	–30
Orissa	–48	–43	–36	–54	–39	–40
Tamil Nadu	–22	–13	–08	–24	–22	–13
Average effect size	–34	–28	–20	–37	–30	–21

Note: SES1 is the lowest quartile of socioeconomic status, SES2 is the second quartile, SES3 is the third quartile, and SES4 is the highest.

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

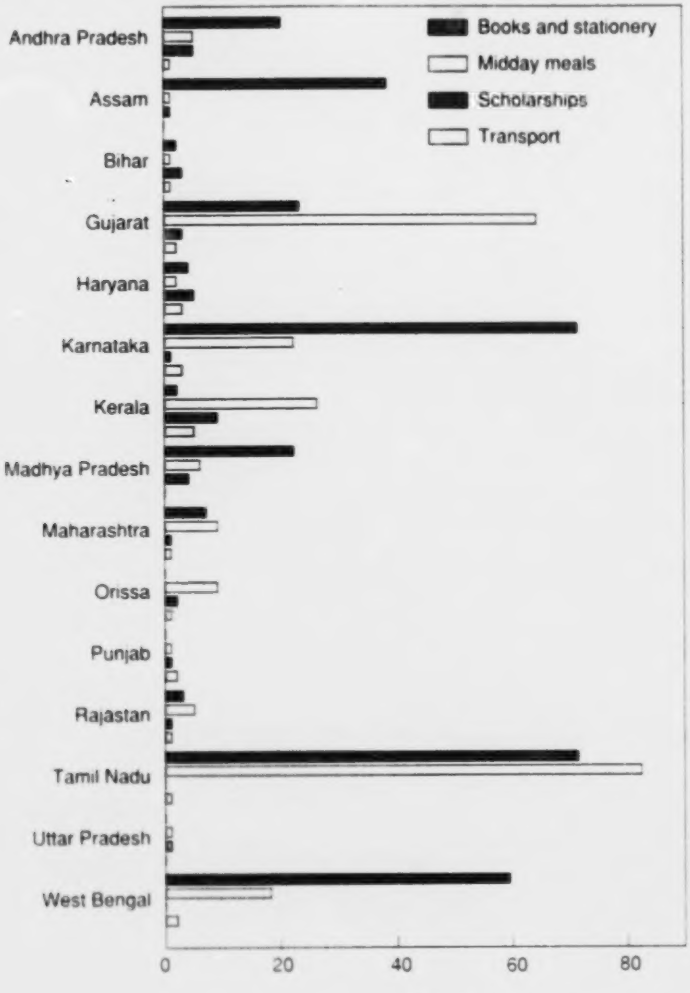
Strategies for Reducing the Poverty Gap

The government of India has introduced a number of incentive schemes for increasing the participation of the poor in school. Some are designed to compensate families for direct and indirect costs by providing scholarships, free textbooks and stationery, midday meals, and free transport. But these schemes cover only a small share of total costs. The average annual scholarship at the primary level is Rs103 (Rs92 in rural areas). And although many states have an official policy of providing free textbooks to all girls and students from scheduled castes and scheduled tribes, only in four states (Assam, Karnataka, Tamil Nadu, and West Bengal) do more than 30 percent of children receive them. On average only 21 percent of children receive free textbooks—and fewer than 5 percent receive them in Bihar, Haryana, Kerala, Orissa, Punjab, Rajasthan, and Uttar Pradesh (see figure 5.1). States could do much to reduce the poverty gap in primary education by effectively implementing their policies on free provision of textbooks to students.

The poverty gap could also be narrowed by better targeting incentives so that more benefits reach persons living below the poverty line. Incentive schemes

Few students eligible for incentives actually receive them.

FIGURE 5.1 PERCENTAGE OF STUDENTS RECEIVING INCENTIVES AT THE PRIMARY LEVEL, 15 MAJOR STATES, INDIA, 1993



Source: NCAER 1994.

have emphasized students from scheduled castes, scheduled tribes, and other backward castes, who comprise 65 percent of scholarship beneficiaries. Yet even though scheduled castes, scheduled tribes, and other backward castes typically constitute the poorest part of the population, only 3 percent of beneficiaries are from "financially weak" households, and only 2 percent receive the incentive on a "merit plus income" criterion. Evidence from a study on the effectiveness and efficiency of incentives in Maharashtra suggests a need to focus more on households' economic situation than on their caste in targeting incentives (appendix A).

A Narrowing Gender Gap

In India gender gaps show up in literacy and all education indicators: compared with boys, fewer girls enroll in school (though the gap is narrowing), fewer stay in school, and those who do stay learn less, with lower learning achievement in language and mathematics in some states. The gender gap in education is significantly larger in scheduled castes and scheduled tribes than in the population as a whole, and it is greater in rural than in urban areas. The most significant gap is in retention—attendance and dropout rates. Most evidence points to household welfare as an important determinant of retention, with work often explaining girls' absences.

Lower Female Literacy

In India as a whole and in all states, literacy rates are much lower for females than for males. According to the 1991 census, the literacy rate for persons ages 7 and above was 52 percent—64 percent for males and 39 percent for females, for a gender gap of 25 percentage points. In Bihar and Rajasthan the gender gap was greater than 30 percentage points. Although the gender gap in literacy for people ages 7 and above declined 2 percentage points in India between 1981 and 1991, the gender gap in the number of nonliterates increased over that period, from 60 million to 70 million.

Higher literacy rates among the young seem to account for the decline in the gender gap. Literacy data from the 1991 census are not disaggregated by age, so direct comparisons among age groups are not possible. But National Sample Survey data from 1987–88 analyzed separately for children ages 10–14 in the 15 largest states show gender gaps in literacy for all but three states (Andhra Pradesh, Rajasthan, and Uttar Pradesh) that are smaller than those for the population ages 7 and above in 1991. In 10 states the gender gap is more than 5 percentage points smaller (see table 5.5). The gender gap in literacy stems largely from the gender gaps in enrollment and retention, both of which have narrowed in recent decades.

TABLE 5.5 GENDER GAP IN LITERACY RATES FOR PEOPLE AGES 7 AND ABOVE (1991) AND 10–14 (1987–88), 15 MAJOR INDIAN STATES
(percentage points)

State	*Age 7 and above, 1991*	*Age 10–14, 1987–88*
Andhra Pradesh	–22	–24
Assam	–18	–5
Bihar	–30	–25
Gujarat	–24	–17
Haryana	–27	–24
Karnataka	–23	–18
Kerala	–7	0
Madhya Pradesh	–29	–28
Maharashtra	–24	–18
Orissa	–28	–19
Punjab	–14	–7
Rajasthan	–34	–50
Tamil Nadu	–23	–14
Uttar Pradesh	–29	–29
West Bengal	–20	–8
All India	–25	–21

Source: Nanda 1992; Sengupta 1991.

Lower Enrollment and Attendance and Higher Dropout Rates for Girls

The gender gap in primary gross enrollment rates has narrowed significantly over the past 15 years, from 32 percentage points in 1980–81 to 22 percentage points in 1993–94. It is typically largest in states with large gender gaps in literacy and low gross enrollment rates, such as Bihar, Orissa, Rajasthan, and Uttar Pradesh (see table 5.6).

Despite the narrowing gap in enrollment, the share of boys attending school is still higher than the share of girls in all states except Kerala. For India as a whole, the gender gap in attendance is 17 percentage points, but there is wide diversity among states. In Bihar, Rajasthan, and Uttar Pradesh the gap is 25 percentage points or more, while in Assam, Kerala, Punjab, and Tamil Nadu it is 7 points or less. There is also diversity within states, between urban and rural communities, with the rural gap as much as 25 percentage points greater than

TABLE 5.6 GENDER GAP IN ENROLLMENT (1993–94) AND NONATTENDANCE RATES (1992–93) FOR SELECTED GROUPS, 15 MAJOR INDIAN STATES

(percentage points)

	Enrollment rate, 1993–94				*Attendance rate, 1992–93*[a]		
State	*All*	*Scheduled caste*	*Scheduled tribe*	*Rural*	*All*	*Rural*	*Urban*
Andhra Pradesh	–16	–22	–44	–23	–17	–20	–9
Assam	–9	–18	–25	–19	–6	–8	–7
Bihar	–42	–52	–32	–30	–35	–26	–17
Gujarat	–25	–11	–36	–32	–14	–17	–7
Haryana	–15	–29	—	–28	–13	–16	–2
Karnataka	–9	–20	–26	–26	–12	–16	–5
Kerala	–3	–2	0	–8	0	0	1
Madhya Pradesh	–26	–29	–30	–31	–14	–18	–3
Maharashtra	–9	–22	–22	–29	–10	–14	–3
Orissa	–39	–61	–67	–29	–15	–16	–10
Punjab	–5	–14	—	–17	–6	–8	0
Rajasthan	–59	–73	–73	–36	–34	–39	–12
Tamil Nadu	–8	–15	–23	–25	–7	–11	–1
Uttar Pradesh	–31	–46	–34	–33	–25	–29	–7
West Bengal	–1	–8	–4	–24	–10	–9	–11
All India	–22	–32	–35	–26	–17	–20	–6

— Not available.

a. The attendance rate is the percentage of population ages 6–14 in school.

Source: For enrollment rates, India, Ministry of Human Resource Development, 1994c; for attendance rates, IIPS 1995.

the urban gap. According to the NFHS, 41 percent of school-age girls in India still do not attend school (IIPS 1995).

National average daily attendance figures are not available, and as discussed in chapter 3, survey questions about attendance may lead to underestimates of actual attendance. But some time-use studies of children in India suggest that girls have fewer hours available for schooling than do boys. As a result, some observational studies find that girls attend school less often than boys. For example, in South Arcot district in Tamil Nadu, 41 percent of registered grade 2 girls and 22 percent of registered grade 5 girls were absent on the day the DPEP baseline surveys were carried out, compared with 30 percent of registered grade 2 boys and 16 percent of registered grade 5 boys (Sharma and

TABLE 5.7 GENDER GAP IN ATTENDANCE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1988–89 AND 1993–94

State	*Average monthly attendance, 1993–94*	*Percentage of students ages 6–14 not attending school for more than 7 days in previous month, 1988–89*
Andhra Pradesh	—	–0.1
Assam	–0.11	3.4[a]
Bihar	—	1.3
Gujarat	—	0.5
Haryana	–0.51[b]	0.3
Karnataka	0.05	1.4
Kerala	0.01	–0.1
Madhya Pradesh	–0.04	–0.1
Maharashtra	0.42[b]	0.9
Orissa	–0.15	–1.0
Punjab	—	13.6
Rajasthan	—	–1.5
Tamil Nadu	–0.30[b]	0.8
Uttar Pradesh	—	0.2
West Bengal	—	–1.1
Average	0.09	1.2

— Not available.

a. Average for northeastern region.

b. Statistically significant at $p < 0.05$.

Source: For average monthly attendance, World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995; for nonattendance, NCAER 1994.

Ramakrishnan 1994). Whether or not these children had dropped out was not reported.

Studies in low-literacy districts in eight states show only a small gender gap in attendance as marked in school registers, however (see table 5.7). Girls are marked present a third to half of a day more per month than are boys in Haryana, Maharashtra, and Tamil Nadu; in the other five states the gender differences in registered attendance are less than a fifth of a day per month and are not statistically significant. NCAER (1994) data also suggest few gender differences in actual school attendance, in most states. However, in northeastern states and Punjab a higher share of girls than boys do not attend school regularly.

More girls than boys drop out of school at all levels. According to the most recent Department of Education statistics (India, Ministry of Human Resource Development, 1994c), 45 percent of girls and 41 percent of boys drop out between grades 1 and 5. Although the gender gap in dropout rates is low and declining (4.2 percentage points in 1991–92, down from 6.3 percentage points in 1980–81), the impact of even this modest gap is significant: each year it means that about 1 million more females than males join the ranks of individuals who lack a completed primary education.

Small Gap in Learning Achievement

Once in school, girls typically achieve at a level only slightly below that of boys, but even this difference is not found in all states or for all subjects. NCERT (Shukla and others 1994) found that the average grade 4 achievement score in 1991 was 47.1 percent correct for boys and 45.6 percent correct for girls. Boys outperformed girls in arithmetic in 12 states, while girls outperformed boys in 4 states. In 15 states boys outperformed girls in word knowledge, and in no state did girls outperform boys.

In the 1993 random sample of grade 4 and 5 students in low-literacy districts in eight states, boys outperformed girls in seven of the eight states in arithmetic and in all states in language. But in half the states the average gender gap in achievement was less than 10 percent of a standard deviation, and in all states it was less than 20 percent of a standard deviation (see table 5.8). In another analysis of the same data in which both household and school context variables were held constant, the average gender gap was greater (Saxena, Singh, and Gupta 1995; see adjusted figures in table 5.8).

Gender differences in language achievement, while small, are a cause for concern. Internationally, most research finds that gender differences in language skills, where they occur, typically favor girls, not boys (Elley 1992). That the opposite is true in India suggests that girls are discouraged from talking and interacting in the classroom, both of which develop language skills. In several states the presence of female teachers was related to smaller gender gaps in achievement, suggesting that female teachers may talk to female students more than male teachers do. Further studies are needed to understand the reasons for the gender gap in language.

Nonenrollment as Main Cause of the Gender Gap

The main reasons given in the National Sample Survey 42nd round (1986–87) for girls' not enrolling are economic activity (33 percent for rural girls, 30 percent for urban girls) and lack of interest (32 percent for rural girls, 33

TABLE 5.8 GENDER GAP IN GRADE 4 AND 5 ARITHMETIC AND LANGUAGE ACHIEVEMENT IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percentage of standard deviation)

	Unadjusted gender gap		*Adjusted gender gap*	
State	*Arithmetic*	*Language*	*Arithmetic*	*Language*
Assam	−12	−14	−13[a]	−13[a]
Haryana	−11	−10	−23[a]	−7
Karnataka	−2	−4	−11[b]	−11[b]
Kerala	−6	0	−6	1
Madhya Pradesh	−12	−8	−18[a]	−20[a]
Maharashtra	−11	−19	−6	−16[a]
Orissa	−13	−10	−15[a]	−16[a]
Tamil Nadu	2	−6	−4	−12[b]
Average effect size	−8	−9	−12	−12

a. Statistically significant at $p < 0.01$.

b. Statistically significant at $p < 0.05$.

Source: For unadjusted gender gap, World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995; for adjusted gender gap, Saxena, Singh, and Gupta 1995.

percent for urban girls). Also important are parental attitudes: parents prefer to educate sons. In a survey in rural Maharashtra 50 percent of mothers said that sons should receive as much education "as they want," but only 32 percent gave the same response for daughters (Jeejeebhoy 1993).

These differences are linked to the way parents value education for their children. While parents value a son's education for its effect on his earning potential and on the family's status, they value a daughter's education for its effect on her marriage prospects.

Also affecting household decisions on schooling is the opportunity cost of children's time, which appears to be higher for girls; surveys suggest that girls spend 15–30 percent more time working than do boys. Nayar and Nuna (1994) report that the principal reasons given by household members for girls' not enrolling in Haryana were the girls' responsibility for domestic work (75 percent) and parents' inability to pay for school expenses (57 percent), uniforms (54 percent), and books (53 percent); 87 percent of girls who were not enrolled cited domestic work as the main reason.

Gender differences in schooling often derive from differences in household investment decisions. In India families often prefer to invest in the education of sons, since the returns to this investment will remain with the family, while the returns to investment in a daughter's education will typically flow to her husband's family. For the same reason, families often prefer to have more sons than daughters. In Haryana only 15 percent of women with two sons wanted more children, while 95 percent of women with two daughters wanted more children. Women wanted boys because they expected them to extend the family lineage and to provide security and financial assistance. They valued girls for their short-term contributions to the household, which often conflict with schooling. In Haryana mothers wanted daughters for religious obligations, housework, and emotional support. As a result, they had higher aspirations for their sons' education than for their daughters' (Malhi 1993).

The principal reasons families give for girls' dropping out are very similar to those for their not enrolling. In the National Sample Survey 42nd round families said that girls are "not interested in education or further study" (33 percent for rural girls, 28 percent for urban girls) or are working for pay (24 and 22 percent) or at "domestic chores" (14 and 16 percent). Among a sample of households in four districts in Haryana the main reasons given for girls' dropping out were domestic work (75 percent), including assisting with household economic production and caring for siblings (42 and 35 percent, respectively; Nayar and Nuna 1994). The direct costs of schooling were also identified as a reason for girls' dropping out, even though NCAER (1994) showed that the cost of educating girls is lower than the cost of educating boys (about Rs16 lower for India as a whole; see table 5.9). In some states (Haryana) female students receive Re1 a day for attendance to offset costs to parents.

The probability that a girl will drop out is also determined by the social and economic characteristics of the household. Multivariate analyses for the age group 6–22 in Maharashtra show that rural girls are less likely to attend school if they are from smaller, scheduled caste, or scheduled tribe households, if the head of the household is nonliterate, or if the dominant activity of working people in the household is self-employment. But, the analyses also suggest that these factors are equally important for rural boys (Acharya and Acharya 1995).

School quality, teaching practices, and curriculum may also contribute to the gender gap. Studies in low-literacy districts in eight states found that the gender gap in achievement was exacerbated by the absence of female teachers, the absence of single-sex schools, the location of schools more than 2 kilometers from home, inadequate teaching and learning materials, and lack of separate toilets for girls. Teaching practices that discriminate against girls and communicate lower expectations for them than for boys also contribute to the gender gap, as do curricula and instructional materials that are irrelevant, unstimulating, difficult, and gender-stereotyped (Nayar 1994a).

To separate school effects from home background effects on the gender gap in achievement, researchers have controlled for the effects of household decisionmaking as measured by the student's socioeconomic background, grade

TABLE 5.9 GENDER GAP IN AVERAGE ANNUAL COST OF SCHOOLING AT THE ELEMENTARY LEVEL, 15 MAJOR INDIAN STATES, 1994
(rupees)

State	*Gender gap*
Andhra Pradesh	22.66
Assam[a]	−16.81
Bihar	−63.57
Gujarat	−17.90
Haryana	−69.35
Karnataka	−40.00
Kerala	−7.35
Madhya Pradesh	−10.88
Maharashtra	−19.77
Orissa	24.89
Punjab	−134.59
Rajasthan	−9.65
Tamil Nadu	17.86
Uttar Pradesh	−17.20
West Bengal	22.12
All India	−16.05

a. Average for northeastern region.
Source: NCAER 1994.

repetition, school attendance, and time spent on homework and outside reading. Each of these measured characteristics of families affects learning achievement. But even after they are taken into account, a small gender gap in achievement remains, suggesting that school or classroom characteristics may play a part.

Strategies for Reducing the Gender Gap

A range of strategies has been proposed in rural low-literacy districts to reduce the gender gap in enrollment and dropout rates, but few of these have any empirical foundation. Some target demand-side constraints: awareness campaigns to educate the community about the importance of education and the economic utility of girls' education, provision of crèches and early childhood education centers to relieve girls of the burden of caring for siblings, and direct incentives (grants, vouchers, or direct provision of fees, books, food, uniforms, and transport) that lower the cost of educating girls. Other strategies target the supply side: increasing the number of schools, especially those for girls, opening nonformal education centers, establishing flexible school schedules to allow girls to combine domestic work and school, providing teaching and learning materials, constructing toilets for girls, appointing more female teachers, and expanding existing schools.

Some districts have proposed providing escort and transport services for girls, giving teaching and administrative staff gender-sensitivity training, and offering girls compensatory education, and some states have proposed revising textbooks to eliminate gender bias. Pilot studies, carefully evaluated, could improve the empirical foundation for these proposed interventions.

Other strategies emerge from hierarchical linear modeling analyses of the determinants of the gender gap in achievement, using data from DPEP baseline surveys of achievement. For example, Saxena, Singh, and Gupta (1995) found that various school characteristics narrowed the gender gap in achievement and that the effects were inconsistent across states. In several states the gender gap was narrowed in schools with a higher percentage of female teachers, confirming the importance of increasing the share of female primary teachers (see table 5.10). It appeared to be widened by other school characteristics, including teacher quality, resource availability, and academic climate. However, several of these effects may be due to the high share of male teachers in the schools

TABLE 5.10 SCHOOL CHARACTERISTICS THAT NARROW THE GENDER GAP IN MATHEMATICS AND LANGUAGE ACHIEVEMENT IN LOW-LITERACY DISTRICTS, SIX INDIAN STATES

State	*Mathematics*	*Language*
Assam	Access to teaching materials; parental involvement	Teacher assigning homework
Haryana		Head teacher acting as leader
Karnataka		Stable teaching staff; high share of female teachers[a]
Madhya Pradesh	Teacher assigning homework	High share of female teachers[a]
Orissa		High share of female teachers; more school physical facilities[a]
Tamil Nadu	Good teacher attendance and provision of special help	High educational attainment among teaching staff; high share of female teachers

a. World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

Source: Saxena, Singh, and Gupta 1995.

with these characteristics and the fact that quality-enhancing inputs are disproportionately directed at male students.

Varying Caste and Tribal Gaps

Members of scheduled castes and scheduled tribes—historically disadvantaged socially, economically, and educationally—have been targeted under post-independence legislation to eliminate discrimination. According to the 1991 census, there are 1,091 scheduled castes and 573 scheduled tribes in India, constituting 16 and 8 percent of the population, respectively. Among states, Karnataka has the largest number of scheduled castes (101), and Orissa the largest number of scheduled tribes (62) (see table 5.11). The definition of scheduled caste and scheduled tribe varies across states, and some castes are identified as both scheduled castes and scheduled tribes, depending on their state of residence. Often both physically and socially isolated from majority

TABLE 5.11 SCHEDULED CASTES AND TRIBES, 15 MAJOR STATES AND ALL INDIA, 1991

State	*Number of scheduled castes*	*Percentage of population identified as members of scheduled castes, 1991*	*Number of scheduled tribes*	*Percentage of population identified as members of scheduled tribes, 1991*
Andhra Pradesh	59	16	33	6
Assam	16	7	14	13
Bihar	23	15	30	8
Gujarat	30	7	29	15
Haryana	37	20	—	0
Karnataka	101	16	49	4
Kerala	68	10	35	1
Madhya Pradesh	47	15	46	23
Maharashtra	59	11	47	9
Orissa	93	16	62	22
Punjab	37	28	—	0
Rajasthan	59	17	12	12
Tamil Nadu	76	19	36	1
Uttar Pradesh	66	21	5	0
West Bengal	59	24	38	6
All India	1,091	16	573	8

— Not available.
Source: Nanda 1992.

communities, scheduled castes and tribes have lower enrollment and achievement rates, and higher dropout rates, than the general population (Aggarwal and Sibou 1992).

Recent evidence suggests that targeted programs for scheduled castes, in particular, may have been effective in reducing disadvantage in education. Because of the large number of castes and tribes, specially tailored interventions developed in close consultation with potential beneficiaries are likely to be more effective than blanket interventions.

Underenrollment of Scheduled Caste and Scheduled Tribe Children

Census, National Sample Survey, and NCAER data all suggest that school participation for both scheduled caste and scheduled tribe children is lower than it is for other children. Literacy rates for scheduled castes (37 percent) and scheduled tribes (30 percent) in 1991 were significantly lower than for the population as a whole (52 percent). Net enrollment rates for children ages 5–9 computed from the 1981 census show a caste gap in participation of 10–20 percentage points and a tribal gap of 15–20 percentage points (see table 5.12). Net enrollment rates for children ages 6–14 estimated from a 1994 household survey found similar gaps nearly 15 years later: a 15 percentage point caste gap and a 17 percentage point tribal gap (NCAER 1995).

But recent Department of Education statistics report primary gross enrollment rates for scheduled caste children ages 6–10 that are significantly higher than those for all children ages 6–10 in all India and for most states, strongly suggesting that schools overreport scheduled caste enrollment (see table 5.13). In Assam, Maharashtra, Orissa, and Punjab the primary school gross enrollment rate for scheduled castes is more than 100 percentage points greater than it is for the population as a whole. At upper primary school, differences are

TABLE 5.12 CHILDREN AGES 5–9 ENROLLED IN SCHOOL, BY CASTE GROUP, INDIA, 1981
(percent)

Group	*Scheduled caste*	*Scheduled tribe*	*Other*
Rural males	32	29	43
Rural females	17	15	30
Urban males	49	49	70
Urban females	40	39	58

Source: Visaria, Gumber, and Visaria 1992.

TABLE 5.13 CASTE AND TRIBAL GAP IN PRIMARY ENROLLMENT (1993–94) AND DROPOUT RATES (1986–87), 15 MAJOR INDIAN STATES

(percentage points)

	Gross enrollment rate, 1993–94				*Dropout rate, 1986–87*[a]			
	Caste gap		*Tribal gap*		*Caste gap*		*Tribal gap*	
State	*Grade 5*	*Grade 8*	*Grade 5*	*Grade 8*	*Urban*	*Rural*	*Urban*	*Rural*
Andhra Pradesh	17	–13	5	–33	10	–7	7	13
Assam	121	95	56	25	18	14	16	–13
Bihar	–4	–11	4	–8	9	2	0	–23
Gujarat	50	25	12	–16	8	–4	21	36
Haryana	8	–18	—	—	18	23	0	0
Karnataka	32	0	18	–14	17	–7	20	14
Kerala	11	12	21	–10	6	16	34	–27
Madhya Pradesh	9	–10	–23	–39	11	8	8	5
Maharashtra	132	74	5	–26	15	12	18	20
Orissa	127	9	–27	–20	–4	10	6	–7
Punjab	132	–3	—	—	5	29	—	0
Rajasthan	–14	–10	–13	–11	9	33	–6	39
Tamil Nadu	12	–1	–22	–36	7	8	8	–10
Uttar Pradesh	–23	–20	–7	–15	2	6	27	0
West Bengal	–2	–26	–2	–20	17	10	0	2
All India	41	7	2	–17	10[b]	10[b]	12[b]	2[b]

— Not available.

Note: The reference group is all students.

a. The number of primary students ever enrolled who discontinue their education as a percentage of ever-enrolled children at the level at which education was discontinued.

b. Average of selected states.

Source: For enrollment rates, India, Ministry of Human Resource Development, 1994c; for dropout rates, NSSO 1993a, 1993b.

much smaller, although the share of scheduled caste children enrolled is greater than the share for all children in five states. These discrepancies may be due to higher retention rates for scheduled caste students, to overreporting of scheduled caste enrollment (possibly in response to targeted incentive programs), to underestimates of the scheduled caste population, or to some combination of the three. In Orissa and Punjab the caste gap favoring scheduled castes drops sharply (from 127 and 132 percentage points to 9 and –3, respectively) between lower primary and upper primary school, which does not provide enrollment incentives for scheduled caste children.

For scheduled tribe children, by contrast, the official enrollment statistics are mixed. These children enroll at rates at least 10 percentage points lower than rates of the population as a whole in Madhya Pradesh, Orissa, Rajasthan, and Tamil Nadu, but at rates at least 10 percentage points higher in Assam, Gujarat, Karnataka, and Kerala. Overreporting, repetition, and errors in population estimates may explain the higher rates.

Lower Attendance and Higher Dropout Rates

Evidence from surveys confirms that participation rates are lower for scheduled caste and scheduled tribe children. A higher percentage of both scheduled caste and scheduled tribe students attend school less regularly than other students, but the difference is small—on average, about 2 percentage points (NCAER 1994). Analysis of DPEP baseline data found that scheduled caste and scheduled tribe students attended school one day a month less (Tamil Nadu) to two-thirds of a day more (Haryana) than other students (see table 5.14). And the NCAER found significantly larger gaps in nonattendance rates for scheduled caste students in Madhya Pradesh (6.4 percentage points) and Assam and the northeastern states (18 percentage points) and for scheduled tribe students in Maharashtra (5 percentage points).

TABLE 5.14 CASTE AND TRIBAL GAP IN ATTENDANCE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

State	*Caste and tribal gap in attendance (days per month)*	*Nonattendance rate*[a]	
		Tribal gap	*Caste gap*
Assam	0.30	0.0[b]	17.8[b]
Haryana	0.60[c]	-2.3	1.0
Karnataka	-0.30	-1.9	-1.1
Kerala	-0.76[c]	0.5	-2.1
Madhya Pradesh	-0.08	-0.3	6.4
Maharashtra	0.11	4.9	0.5
Orissa	-0.15	0.9	-2.0
Tamil Nadu	-1.04[c]	-1.0	-0.1
Average	-0.17	0.1	2.5

Note: The reference group is all students.

a. The percentage of students ages 6–14 not attending school for more than seven days in the working month preceding the survey.

b. Average for northeastern region.

c. Statistically significant at $p < 0.05$.

Source: For monthly attendance, World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995; for nonattendance, NCAER 1994.

A recent study of 60 schools in two tribal districts in Andhra Pradesh found high absenteeism among tribal children who were enrolled (Sujatha 1995). In grade 1 absenteeism averaged about 55 percent but varied among schools. In some schools more than two-thirds of the enrolled students attended school only about 15 percent of the time. Noting that absenteeism is higher in grades 1 and 4 than in grades 2 and 3, Sujatha posits that very young children and those old enough to help with household work are less likely to attend regularly.

According to Department of Education statistics, dropout rates for scheduled caste students were indistinguishable from those of the general population in 1988–89, averaging about 50 percent for grades 1–5, down from about 60 percent in 1980–81. The caste gap in dropout rates widened slightly, from 1.3 percentage points in 1980–81 to 1.8 percentage points in 1988–89, but is insignificant against the large overall decline in dropout rates. For grades 1–8 the dropout rate for scheduled caste students declined from about 77 percent to about 68 percent over the same period, while that for the general population declined from about 73 percent to about 65 percent, so that the caste gap changed little.

The tribal gap in dropout rates was much greater: about 17 percentage points in both 1980–81 and 1988–89 for grades 1–5 and 13 percentage points for grades 1–8. According to National Sample Survey 42nd round data from Maharashtra, the largest caste gaps in dropout rates are in rural populations, while the largest tribal gaps are in urban populations. In 1986–87 the caste gap was about 17 percent for rural children, compared with less than 1 percent for urban males and about 8 percent for urban females. The tribal gap was less than 3 percent for rural males and less than 2 percent for rural females, whereas it was about 4 percent for urban males and 12 percent for urban females (see table 5.15).

TABLE 5.15 STUDENTS AGES 6–22 NOT CONTINUING THEIR EDUCATION, BY CASTE GROUP, MAHARASHTRA, 1986–87
(percent)

Group	*Scheduled castes*	*Scheduled tribes*	*Nomadic tribes*	*Other*
Rural females	75	60	53	57
Rural males	54	40	40	38
Urban females	44	48	44	36
Urban males	28	34	34	29

Source: Acharya and Acharya 1995.

What explains the higher dropout rates among children from scheduled castes and tribes? Household welfare is an important factor. But multivariate analysis of National Sample Survey data from Maharashtra that controlled for household welfare (household expenditure, religion, principal type of household labor, literacy of head of household, household size, and landholdings) showed that caste and tribal status is also important. With household welfare controlled for, continuation rates for rural males, rural females, and urban females were lower for scheduled castes and scheduled tribes than for other groups; only for urban males was there no difference (Acharya and Acharya 1995). Thus, interventions to bring the participation of scheduled tribe students, and the retention of both scheduled caste and scheduled tribe students, up to the rates of the rest of the population may need to address nonwelfare issues. Such interventions are discussed later in this section.

Lower Achievement

Both scheduled caste and scheduled tribe students perform less well than other students on tests of language and mathematics. In the 1991 survey they scored slightly lower on overall achievement relative to other, non-backward-caste students: 38.9 percent of the answers were correct for scheduled caste students and 38.5 percent were correct for scheduled tribe students, compared with the average for all students of 40.6 percent correct answers (Shukla and others 1994).

In the 1993 study of achievement in low-literacy districts, differences were also small. Scheduled caste students performed less well than all students in mathematics in five of eight states and language in six of eight states, with the difference greater than 25 percent of a standard deviation for mathematics in Haryana, Karnataka, and Kerala and for language in Karnataka, Kerala, and Orissa (see table 5.16). But in Assam scheduled caste students outperformed all students in mathematics by nearly 40 percent of a standard deviation. Scheduled tribe students also performed less well than all students in most states, with the difference greater than 25 percent of a standard deviation for both mathematics and language in Assam, Karnataka, and Orissa. An analysis that grouped scheduled caste and scheduled tribe students found that they performed less well than other students in arithmetic in all eight states and in language in six states (see last two columns in table 5.16).

The differences in average achievement between scheduled caste and scheduled tribe students and other students are attributable largely to differences in socioeconomic status. Analyses of DPEP baseline survey data show that in all eight states the differences decline when family background characteristics are

TABLE 5.16 CASTE AND TRIBAL GAP IN GRADE 4 OR 5 ACHIEVEMENT IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percentage of standard deviation)

	Caste gap		*Tribal gap*		*Caste and tribal gap*	
State	*In arithmetic*	*In language*	*In arithmetic*	*In language*	*In arithmetic*	*In language*
Assam	39	19	–34	–27	–5	5
Haryana	–28	–15	–21	–10	–9	11
Karnataka	–26	–25	–33	–26	–9	–4
Kerala	–33	–41	0.1	–27	–27	–41
Madhya Pradesh	–18	–21	–15	–10	–6	–7
Maharashtra	–8	–2	9	19	–8	1
Orissa	–9	–29	–46	–36	–7	–6
Tamil Nadu	–4	–17	–23	–10	–2	–8
Average effect size	–11	–16	–20	–16	–8	–6

Source: For caste and tribal gaps presented separately, World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995; for combined caste and tribal gap, Saxena, Singh, and Gupta 1995.

statistically controlled for, remaining statistically significant on tests of mathematics in only four states and on reading tests in only three (see figure 5.2).

Causes of the Caste Gap

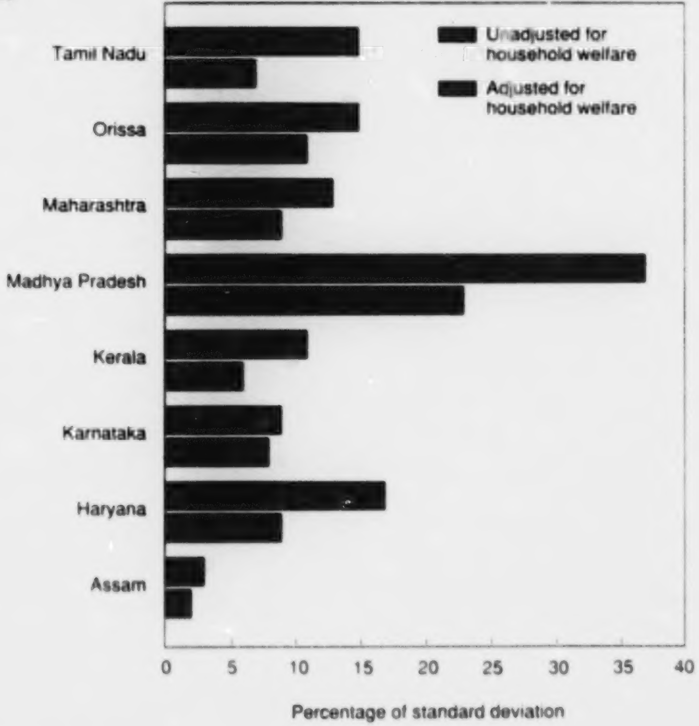
According to research by Indian scholars, economic circumstances are the most important cause of the caste gap in education. Scheduled caste households often have lower incomes—a consequence of past discrimination—and children in these households are much more likely to be employed than are children in other households. In 1981, 70 percent of scheduled caste children age 14 were out of school and working, compared with 24 percent of other children (Aggarwal and Sibou 1992).

Past traditions of discrimination also help explain the caste gap, and overt discrimination against scheduled castes still occurs in primary schools. In some schools in Madhya Pradesh, Jalaludin (1991) observed scheduled caste children being required to sit separately in one corner of the classroom or at the door outside the classroom. Nambissan (1995) notes

> the distinct message of social inferiority that is often quite clearly conveyed to [scheduled caste students] by teachers and peers. Personal narratives of [members of scheduled castes] educated just three decades

Household welfare is a big factor in achievement of children from scheduled castes and tribes.

FIGURE 5.2 GAP IN MATHEMATICS ACHIEVEMENT FOR PRIMARY STUDENTS FROM SCHEDULED CASTES AND TRIBES IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993



Source: Saxena, Singh, and Gupta 1995.

ago offer glimpses of untouchability blatantly practiced in school—Scheduled Caste students being asked to sit separately from their classmates, refused drinking water or served in broken cups, made to dine separately. For instance, as many as 80 percent of the 1,030 students from Milind College, Aurangabad who were surveyed in 1971–72 said that they were made to sit outside the classroom during primary schooling because of the practice of untouchability. (pp. 20–21)

Most research on discrimination against scheduled castes in education has looked at secondary and higher levels of schooling (see Aggarwal and Sibou 1992 for a review of this literature), however, and much of the research documents past rather than current conditions.

Overt discrimination has been exacerbated by the composition of the teaching corps. Most teachers are from nonscheduled castes and hence may not be sensitive to cultural issues for scheduled caste students. But with national efforts to raise the status of scheduled castes having undeniably improved their position, this problem is declining.

Strategies for Reducing the Caste Gap

Removing the stigma from being a member of a scheduled caste was a central concern of Mahatma Gandhi's philosophy. Strategies for reducing the caste gap have included protective (reverse) discrimination and incentives. To ensure that incentives continue to benefit scheduled caste students will require reducing the programs' cost by improving targeting—making sure that the benefits do not go to persons who are not qualified but that they do reach persons whose incomes are so low that incentives are a necessary prerequisite for children's attendance. This will not be easy. The present practice is to extend benefits to everyone (the School Feeding Program of 1995, for example, provides supplemental food for all children). With most of the caste gap explained by economic circumstances, the central and state schemes for improving household welfare are also important for children in scheduled caste households.

Causes of the Tribal Gap

Household welfare is less important in explaining the tribal gap in education. This section reviews three other factors that may be important: cultural discontinuity between family and school, the language of instruction, and the quality of schools.

CULTURAL DISCONTINUITY. Family, community, and school factors all play a part in limiting enrollment, retention, and achievement among tribal children. Tribal children often live in small, poor, remote hamlets that lack schools. Some tribes still observe traditional "pollution" laws that restrict their interaction with other communities, limiting the acceptability of regional schools that would serve more than one community. Most tribal children are first-generation students, so their families are less likely to be familiar with and to support school learning. As a result, children from tribal households may come

BOX 5.1 WHY TRIBAL CHILDREN MAY NOT LIKE SCHOOL

Researchers studying the Kondareddy and Khammam tribes in Andhra Pradesh found that a third of the children of school age did not attend school, preferring instead to spend their time "moving freely around, swimming in ponds and streams, catching fish, climbing trees, hunting birds, collecting berries, riding on buffaloes, etc." (Sujatha 1995, p. 17). The researchers observed, "In school the children are expected to be highly disciplined and to follow the rigid timings and be confined to [a] classroom. The socialization in tribal society presents children with a lot of freedom and free nature. Very rarely are the children punished. The conflict between the norms of school and socialization at home results in resistance and unwillingness among children to attend the school" (Sujatha 1995, p. 17).

to school less prepared to learn. In a study of preschool children from the Gond and Baiga tribes in the Shahdol district of Madhya Pradesh, Naik and Ahuja (1994) found that the children were unfamiliar with the illustrations in the grade 1 textbook, were able to count only to 5, and were unfamiliar with drawing or writing.

Behavior required of children at school may be unfamiliar to tribal families (see box 5.1). And traditional methods of carrying out such activities as solving problems using arithmetic may differ from what is taught in schools. For example, tribal arithmetic is not based on the decimal system (Ambasht and Rath 1995b).

Discontinuity between family and school may mean that tribal communities are not aware of benefits to which they are entitled. Fewer than 60 percent of parents surveyed in tribal communities knew of incentive schemes operating in the school in which their children were enrolled (Daswani 1994).

LANGUAGE OF INSTRUCTION. According to Ambasht and Rath (1995b), the language of instruction is the single most important factor affecting the response of tribal people to formal education. Present policy allows much flexibility. Government of India policy provides for instruction in the local language, although most tribal parents surveyed wanted their children to be educated in the more widely spoken regional language.[2] In most states surveyed, the majority of teachers use the regional language in class and a large share of children speak the regional language at home (see table 5.17). But Ambasht and Rath (1995b) found that on average only 60 percent of teachers believed that tribal children understood textbooks written in the regional language. In the earliest grades, the teacher's familiarity with the local community

TABLE 5.17 LANGUAGE USE AND KNOWLEDGE IN SCHOOLS IN TRIBAL REGIONS, INDIA, 1993
(percent)

State	*Teachers using regional language in class*	*Students speaking regional language at home*	*Teachers belonging to the local community*
Assam	67	54 (Assamese)	95
Karnataka	83	54 (Kannada)	67
Kerala	78	46 (Malyalam)	8
Madhya Pradesh	50	25 (Hindi)	68
Maharashtra	86	30 (Marati)	25
Orissa	79	0 (Oriya)	9
Tamil Nadu	96	100 (Tamil)	14

Source: Daswani 1994, tables 8.1–8.4.

may affect the children's understanding; 25 percent or fewer of the teachers surveyed in Kerala, Maharashtra, Orissa, and Tamil Nadu belonged to the local community in which they taught and spoke the local language. Only in Assam were virtually all teachers members of the local community.

SCHOOL QUALITY. Also contributing to the tribal gap in achievement are differences in the resources of schools with high and low concentrations of scheduled tribe students.[3] Research in low-literacy districts in eight states found that schools with a high concentration of scheduled tribe students had fewer of the types of resources often associated with higher learning achievement: fewer *pukka* buildings (Madhya Pradesh, Orissa), less furniture and equipment (Kerala, Maharashtra, Orissa, Tamil Nadu), fewer instructional aids (Assam, Tamil Nadu), fewer teachers educated to grade 10 or above (Assam, Madhya Pradesh, Tamil Nadu), and fewer teachers with recent in-service training (Assam, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu).[4] In 256 comparisons, 54 statistically significant differences were found (Rath and Jangira 1995).

This disadvantage occurs even though private expenditures for education are 15 percent higher in schools with a high concentration of tribal students than in schools with a low concentration of such students. Although these expenditures may result from government transfers to parents, they also suggest that parents of children in poor schools are making an effort to compensate for the lack of facilities. Without these contributions, resource availability presumably would be poorer still in these schools.

Other school quality variables may also affect the caste and tribal gap in achievement. Saxena, Singh, and Gupta (1995) found that in Karnataka parental involvement reduced the gap in language achievement, while in Kerala testing and feedback reduced the gap.

Strategies for Reducing the Tribal Gap

The causes of the tribal gap in education point to key strategies for improving the school participation of scheduled tribe children: improving the targeting of interventions toward states and districts with high concentrations of scheduled tribes, using teachers as change agents, and matching interventions to local conditions.

OVERCOMING TARGETING DIFFICULTIES. The geographic dispersion of tribal children makes implementing interventions difficult. Two-thirds of all scheduled tribe members live in six of the largest states: Madhya Pradesh (15 million), Maharashtra (7.3 million), Orissa (7 million), Bihar (6.6 million), Gujarat (6.2 million), and Rajasthan (5.5 million). But in all these states (except Maharashtra), more than 90 percent of scheduled tribe members live in nonurban settlements, making interventions difficult to administer and requiring heavy reliance on schools and teachers for implementation.

USING TEACHERS AS CHANGE AGENTS. A dedicated teacher can increase the school participation and learning achievement of tribal children (see box 5.2). Daswani, Shukla, and Vani (1995) suggest that teacher training should emphasize tribal languages and culture, with a view to promoting a more posi-

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BOX 5.2 HOW ONE TEACHER CAN MAKE A DIFFERENCE

The appointment of a teacher with a positive attitude, an interest in tribal life and culture, and a belief that, when taught properly, tribal children are educable made a big difference to an interior and backward region of Godavari district in Andhra Pradesh (Sujatha 1995). When the teacher was transferred to a school in a village inhabited by one of the most "primitive tribal groups" (Kondareddi), only 8 of the 34 children enrolled regularly attended school. To bring the children to school the teacher was deliberately severe, but once they were in school he encouraged their active participation. He visited each household in the village to obtain parents' consent for the children to attend school and then went around the village daily to call the children to school. Researchers reported that during their field observations the children arrived at school even before the teacher. All the students in grades 1 and 2 were able to write the alphabet and to read the textbook fluently. And they were very self-confident.

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tive attitude toward tribal children and communities among teachers. Recruiting teachers from the local community and operating literacy and enrollment campaigns may also be effective.

MATCHING INTERVENTIONS TO LOCAL CONDITIONS. The diversity of tribal groups, their remoteness from urban locations, and the variety of conditions under which they live call for much local participation in developing strategies to improve education. Daswani, Shukla, and Vani (1995) suggest emphasizing local planning and implementation of education to allow the participation of tribal people, changing the school inspection system for tribal schools to encourage supervision by parents, and increasing community participation through village education committees and traditional youth organizations. Also helpful would be to adjust the school calendar to accommodate the agricultural seasons and religious festivals in scheduled tribe areas. Because many tribal children live in small communities likely to have fewer than 40 children of primary school age, the provision of one-classroom multigrade schools may be an important strategy for reaching these children, even if this is inconsistent with national norms for two-teacher schools. And where tribal students live in small towns in which they are integrated with the dominant community, strategies that facilitate their integration are important.

DEVELOPING TEACHING AND LEARNING MATERIALS IN TRIBAL DIALECTS. Supplemental instructional materials in tribal languages could be developed, particularly for children in the earlier grades. Simple phrasebooks for teachers who do not speak local languages could also help narrow any communication gaps.

Conclusions

Poverty is the main cause of gender, caste, and tribal gaps in enrollment and retention in India and may also contribute to gaps in learning achievement. State programs designed to mitigate the effects of poverty by providing incentives for school participation are therefore an appropriate strategy for improving education outcomes for a large group of disadvantaged children. But as chapter 3 shows, these interventions are insufficient and poorly targeted, and at the school level they may lead to overreporting of the enrollment of girls and students from scheduled castes and scheduled tribes. Although targeting interventions to households may be impractical, better targeting of interventions will be necessary if the limited resources available for compensatory programs are to have the greatest effect. Providing textbooks for all poor students, regardless of gender or caste or tribal status, may be the most effective incentive.

For girls, strategies for reducing gaps in achievement require school-level interventions. Increasing the share of female primary teachers could boost girls' learning achievement, particularly in language development. In-service and pre-service teacher training that promotes student-teacher interaction in the classroom—such as assigning and reviewing homework or providing special help to students—also may have beneficial effects for girls. Many strategies have been proposed for improving education outcomes for girls, but more research is needed to assess their effectiveness.

With most of the differences in education outcomes for scheduled caste students attributable to economic circumstances, incentive programs and central and state schemes to improve household welfare will continue to be important in narrowing the caste gap. Household welfare is also a significant consideration in improving education outcomes for girls, whose absences are often due to work. But some of the constraints contributing to gaps in education are more cultural than economic. These constraints—and appropriate strategies for addressing them—vary among disadvantaged groups and, for tribal students, within them.

For scheduled tribe students non-welfare-based strategies need to emphasize greater accommodation of cultural differences, including language, and greater local participation in school-related activities. For scheduled tribe students living in very small villages, one-room multigrade schools need to be considered. For those living in integrated towns and villages, interventions are also needed to facilitate their integration.

Strategies for improving education outcomes not only vary among groups. They also vary across states, supporting the move toward decentralized planning already beginning under the DPEP.

CHAPTER SIX

Improving Teachers' Performance

Improving teachers' performance is the most important challenge for primary education in India. For all states, teachers' salaries constitute the largest share of the education budget, and the states cannot afford to waste any of these resources. Teachers are the principal instructional instrument in the small schools that make up the majority of India's primary schools—on average in 1993, primary schools had fewer than three teachers each. And as chapters 4 and 5 show, teachers' performance falls short of what is needed for all children to complete primary school with adequate learning.

The governments of India have made great strides in improving the quality of the teaching corps—raising pre-service general education requirements, improving pre-service and in-service training, and increasing the number of female teachers and teachers who share their students' social backgrounds. But the capacity of the teaching force to deliver high-quality education is constrained by historical deficiencies in teachers' education and training and the absence of performance incentives. As a result, many teachers often have little understanding of the material they teach, possess few teaching skills, and are poorly motivated—qualities reflected in primary students' learning achievement. In addition, despite efforts to increase the diversity of the teaching corps, many states still have few female, scheduled caste, and scheduled tribe teachers to serve as role models for children. Thus, to increase the effectiveness of the teaching force and achieve minimum levels of learning by children, the challenge for the next decade is to improve the preparation, motivation, and deployment of teachers.

There is good potential for improvement. The teaching corps in many states is aging, and as older teachers, who generally have less education than their younger counterparts, begin to retire, they will make way for new recruits, who typically hold college or university degrees. These incoming teachers will not need lengthy pre-service teacher training, but they will need training in basic teaching skills and in child development. Existing facilities for pre-service training can be used to provide short courses in pedagogy and continuous programs of in-service education.

Particular care will need to be given to developing and implementing in-service teacher training programs that are effective in improving the quality of classroom teaching. Also important is strengthening teachers' motivation by improving working conditions and introducing incentive systems, possibly involving village education committees and *panchayati raj* institutions. And recruitment and deployment practices could seek to match teachers more closely with students.

Who Are India's Teachers?

Primary teachers comprise the largest, most steadily growing profession in India, with nearly 2.8 million primary and upper primary teachers employed in 1993. In 1991 teachers accounted for 11.8 percent of all government employees (India, Ministry of Human Resource Development, 1994c; India, Tenth Finance Commission, 1994). Across the country the annual growth rate of the teaching corps averaged 2.8 percent for primary teachers and 6.3 percent for upper primary teachers from 1951 to 1992 (Tyagi 1993) and 11.3 percent for primary and 10.3 percent for upper primary teachers between 1986 and 1993 (NCERT 1995).

The growth rate varies across states, however. In such states as Kerala and Tamil Nadu, where gross enrollment rates are high and population growth rates are falling, the teaching corps is stable. In such states as Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh, where gross enrollment rates are relatively low and population growth rates are increasing, the teaching corps is expanding rapidly, although not fast enough to keep up with expanding populations. As a result, in these states the student-teacher ratio has risen over the past decade. Tyagi (1993) reports that the ratio increased from 41:1 to 52:1 in Bihar, from 39:1 to 58:1 in Uttar Pradesh, and from 38:1 to 55:1 in West Bengal between 1981–82 and 1992–93. And as reported in chapter 3, the 1993 figures may be even higher.

TABLE 6.1 SELECTED CHARACTERISTICS OF PRIMARY TEACHERS IN 15 MAJOR STATES AND LOW-LITERACY DISTRICTS IN 8 INDIAN STATES, 1993
(percent)

	Female		*Scheduled caste*		*Scheduled tribe*				
State	*All districts*	*Low-literacy districts*	*All districts*[a]	*Low-literacy districts*	*All districts*[a]	*Low-literacy districts*	*Father non-literate*	*Ages 45 or older*	*Males with educated spouse*
Andhra Pradesh	32	—	15	—	1	—	—	—	—
Assam	29	25	7	5	15	19	43	36	5
Bihar	20	—	10	—	8	—	—	—	—
Gujarat	39	—	13	—	15	—	—	—	—
Haryana	46	50	6	6	0	0.4	46	39	4
Karnataka	33	22	13	17	2	3	21	32	11
Kerala	67	55	4	4	0	1	5	31	33
Madhya Pradesh	25	16	12	13	15	16	50	38	16
Maharashtra	39	19	12	17	6	7	48	38	7
Orissa	23	20	8	8	9	13	32	21	14
Punjab	58	—	12	—	0	—	—	—	—
Rajasthan	27	—	8	—	5	—	—	—	—
Tamil Nadu	41	29	17	14	0	0	16	58	16
Uttar Pradesh	25	—	12	—	0	—	—	—	—
West Bengal	23	—	11	—	2	—	—	—	—
All India	31	—	11	—	6	—	—	—	—
Average		30		11		8	33	37	13

— Not available.
a. 1986.
Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995; NCERT 1992b, 1995.

Gender

Across India and in most states men outnumber women by more than two to one in primary teaching, although the share of women teachers has increased greatly since independence. In 1993, 31 percent of primary teachers and 35 percent of upper primary teachers were women, up from 15 percent in 1950–51 (see table 6.1). Between 1950–51 and 1993–94 the number of female primary teachers increased fivefold, and the number of female upper primary teachers increased elevenfold, for average annual increases of 12 and 27 percent. This dramatic growth in the number and share of women in primary teaching has recently slowed; the share of women grew only 3 percentage points in primary teaching and 2 percentage points in upper primary teaching between 1986 and 1993 (NCERT 1995).

The share of female teachers varies across states, ranging from 20 percent in Bihar to 67 percent in Kerala, and is highly correlated with states' female literacy rate and girls' enrollment. Within states, the share of female teachers is lower in low-literacy districts. For example, in low-literacy districts in Assam, Karnataka, Madhya Pradesh, Maharashtra, and Orissa, less than a quarter of primary teachers are women.

Social Class Background

Although no recent national statistics are available on the social class background of teachers, surveys of teachers in low-literacy districts suggest that they come from more advantaged backgrounds than both the general population and their students (table 6.1). About two-thirds of teachers surveyed in low-literacy districts had fathers who were literate (compared with literacy rates of 39 and 47 percent for males ages 7 and above in the general population in 1971 and 1981).

A smaller share of teachers classify themselves as scheduled caste than the total population and the population of the districts in which they work. In 1986, 11 percent of all teachers classified themselves as scheduled caste, compared with 16 percent of the total population. The underrepresentation of scheduled castes among teachers in low-literacy districts is even more striking. In Haryana fewer than 3 percent of teachers in low-literacy districts classified themselves as scheduled caste, compared with 16–23 percent of the districts' total populations.

Similarly, a smaller share of teachers classify themselves as scheduled tribe compared with the total population and with their district's population. Although 8 percent of the total population are classified as members of scheduled tribes, only 6 percent of all teachers in 1986 were considered members of scheduled tribes. The share of scheduled tribe teachers in low-literacy districts was equal to the share in the total population, but this was largely because of higher shares in three states, Assam, Madhya Pradesh, and Orissa. In all states except Assam, however, the percentage of teachers who classified themselves as scheduled tribe was smaller in all sampled districts than the share of scheduled tribe members in the district's population. About a third of teachers in low-literacy districts classified themselves as from "other backward classes" (NCERT 1992b; Jangira, Singh, and Yadav 1995a). The underrepresentation of scheduled castes and scheduled tribes among teachers may be due to a small pool of teacher candidates from these groups or to a preference in these groups for occupations other than teaching. More research is needed on this issue.

How Are Teachers Prepared?

Strategies for preparing teachers vary across states. In states with rapidly growing primary school enrollment, preparation of teachers focuses on pre-training general education and pre-service teacher training. In states with stable primary school enrollment, teacher preparation focuses on in-service training.

Pre-Training General Education

The Central Advisory Board of Education (CABE) and the Parliament have envisaged raising the general education of primary teachers to 12 years of schooling in all states. As a result, most states, including 10 of the largest states (Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh), have raised the general education requirement for teachers from 10 to 12 years of schooling (A. Singh, personal communication, April 14, 1996). This places India ahead of other countries with comparable education indicators and on a par with some members of the Organization for Economic Cooperation and Development (OECD). For example, China requires 9 years of general education for primary teachers, and Pakistan requires 10 years. The minimum educational attainment for primary teachers in OECD countries is generally 12 or 13 years (OECD 1994).

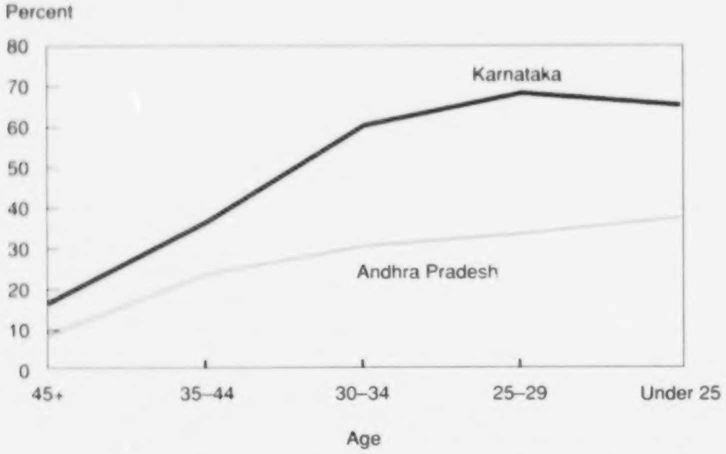
Although formal requirements are still occasionally waived, many older and most new teachers have completed secondary schooling. A 1993 study of teachers in schools in low-literacy districts found that, on average, 40 percent of primary teachers had completed 12 or more years of general education, and the average educational attainment of teachers has been gradually increasing (Jangira, Singh, and Yadav 1995a). In Andhra Pradesh and Karnataka, for example, the average educational attainment in low-literacy districts in 1994 was higher for younger teachers than for older teachers (see figure 6.1).

Pre-Service Teacher Training

With the exception of teachers in states with no teacher training requirements, most teachers receive two years of pre-service teacher training. About 90 percent of primary teachers are trained—that is, they have acquired a primary or elementary teaching certificate or a bachelor's degree in education. The vast majority hold a primary teaching certificate, awarded following 10 or 12 years of general education and on the completion of two years of training (except in Andhra Pradesh, Assam, and West Bengal, which offer a one-year course; Jangira, Singh, and Yadav 1995a). Almost all states are moving toward a two-year diploma in elementary education following 12 years of schooling, in accordance with central guidelines.

The general education attainment of teachers is rising.

FIGURE 6.1 PERCENTAGE OF PRIMARY TEACHERS WITH MORE THAN 10 YEARS OF GENERAL EDUCATION IN LOW-LITERACY DISTRICTS, ANDHRA PRADESH AND KARNATAKA, 1994



Source: World Bank staff analysis of DEP baseline data (NCERT, NIEPA, and New Concept 1995).

Of the larger states, only Assam, which has no formal pre-service training requirement, reports that less than 90 percent of primary or upper primary teachers have been trained (EdCil 1995). But several of the smaller states report that less than 50 percent of teachers have been trained (43 percent of primary teachers and 41 percent of upper primary teachers in Arunachal Pradesh, 46 and 29 percent in Manipur, 42 and 36 percent in Meghalaya, 48 and 26 percent in Nagaland, 49 and 41 percent in Sikkim, and 34 and 35 percent in Tripura).

The duration of pre-service teacher training has not diminished commensurately with the increase in pre-training general education requirements. A two-year training program was established in the 1950s and 1960s, when people with only 8 or 10 years of schooling were available for teaching. This program gives trainees the opportunity to upgrade the content of their education and to receive training in pedagogy. Separate, nonuniversity institutions were established because teacher candidates were not eligible for university education. Now that candidates with 12 years of schooling—and even university graduates—seek employment as primary teachers, the duration and timing of professional teacher training could be revisited.

In-Service Teacher Training

To compensate for teachers' limited subject knowledge and repertoire of teaching practices, governments have supported the development of in-service teacher training. As currently offered in most states, however, in-service training occurs too rarely to improve knowledge or to change teaching practices. In 1986 less than 6 percent of primary teachers reported having undergone in-service training of at least two weeks during the previous year (NCERT 1992b). On average, teachers in low-literacy districts have received fewer than 20 days of in-service training since their appointment as a teacher, or about one day a year. In some states many teachers have received no in-service training—38 percent in Assam and 26 percent in Madhya Pradesh, for example.

TRAINING EFFECTIVENESS. International experience with teacher training suggests that learning complex skills, such as those required to promote active learning, requires several days of initial training followed by periodic reinforcement to sustain changes in teaching behavior. This is borne out by experience in Andhra Pradesh, where teachers underwent a 10-day training course to learn more active teaching and learning methods. This initial training was followed by two to three months of practice with the new methods and a three-day refresher course. An evaluation of the training program's effectiveness found that seven months after the initial training, teachers were implementing, on average, about 75 percent of what had been taught but only about 30 percent of the intended program (K. N. Rao 1994). One reason for such transmission losses in in-service training is that programs seldom plan and follow up on the transfer of training to classroom practice.

In-service teacher training is also rarely conducted well. NCERT-sponsored evaluations for three states of the in-service training program given in 1986–89 for 1.7 million teachers found that most of the training was provided through formal lectures. Demonstrations of teaching practices were both rare and in high demand by the teachers. Later observations found that the program rarely applied the in-service training to classroom practice (Kundu, Mangla, and Singh 1988; Ramadas 1988). The evaluation in Andhra Pradesh found that the tutors who delivered the training course to the teachers failed to transmit all aspects of the curriculum. In one area—providing for individual differences—no aspect of the curriculum was transmitted. In four of the other five areas, 67–92 percent of the material was transmitted. In only one area—creating an interesting classroom by effective display—were all aspects of the curriculum transmitted

(K. N. Rao 1994). Active learning, application to classroom practice, regular follow-up, and action research are key to improving transmission and sustaining change (see box 6.1).

THE INFRASTRUCTURE. Most in-service training is provided through DIETs, cluster and block resource centers, and nongovernmental organizations (NGOs). DIETs are comprehensive institutions equipped to provide technical support to the district education administration for improving the quality of elementary education. They provide pre-service and in-service training and training in planning and management, curriculum, materials development and evaluation, and educational technology. They also serve as district resource units for adult and nonformal education. Of the 425 proposed DIETs, 400 have been sanctioned and about 250 were in operation in 1996.

DIETs provide continual in-service training to all elementary teachers in a district. Because of the magnitude of this task and to ensure quality through continuous support in implementing improved classroom practices, block resource centers and school clusters have been established in many districts. SCERTs and the NCERT provide professional and logistical support to DIETs. In Uttar Pradesh Basic Education Project districts, this in-service training infrastructure is in place, and in DPEP states it is being created.

Block and cluster resource centers in DPEP states are taking over much of the in-service teacher training, a shift that could transform DIETs into institutions for coordination, academic support, and quality control (EdCil 1995). Under the DPEP, in-service training programs are being strengthened and teachers' working conditions improved through the development of a training system and the infrastructure needed to make training a continuous process based in classrooms and linked to school improvement. The new in-service training system has three core activities: developing initial designs and systems for training trainers and teachers, developing the physical infrastructure needed to bring training to blocks and school clusters, and developing materials to incorporate minimum levels of learning into textbooks and classroom practices in later stages of the projects. The new systems will also incorporate activities for resource exchange and documentation and for evaluation.

INNOVATIVE PILOT PROGRAMS. Two pilot programs of teacher training embody principles that deserve mention: Joyful Learning and Teacher Empowerment. These programs are being implemented by NGOs in several states on a pilot basis and are being extended under the DPEP with modifications and improvements.

Based on innovative experiments that involve children in active learning, Joyful Learning campaigns are being launched in six states by four NGOs:

BOX 6.1 IN-SERVICE TRAINING FOR ACTIVE LEARNING IN UTTAR PRADESH

The Uttar Pradesh Basic Education Project emphasizes in-service training that equips teachers to encourage active participation of students in learning. To ensure that continual annual school-based in-service training is provided to the more than 20,000 teachers in the 10 districts covered, the project undertook a program of institutional capacity-building, establishing a training resource group consisting of a faculty of five in the state councils of educational research and training at Allahabad.

Working closely with the NCERT, the group designed the first cycle of training with the main objective of preparing teachers to adopt classroom practices that involve students in individual, small-group, and large-group learning activities. The context for the training and for the practicing of skills was the development of language and mathematics competencies for grades 1 and 2. The training resource group and the NCERT prepared and tested training material encouraging an active learning approach, teachers' reflection on new practices in the context of their schools, teachers' adaptation of material to local conditions, and collaboration. The training emphasized school improvement and learning by all children. It was held during a six-day residential session at block resource centers, followed by monthly one-day sessions at school cluster resource centers.

The training uses a cascade delivery mechanism. The State Council for Educational Research and Training (SCERT) expert training resource group developed training material, trained trainers of master trainers, and maintained quality. District institutes for education and training (DIETS) trained master trainers from block resource

Eklavya, Shastra Sahitya Parishad, All India People's Science Network, and Bharat Gyan Vigyan Samithi. The campaigns, whose motto is "school with a smile," aim to motivate children and teachers to like learning. They work through children's science festivals and through village *balmelas* (children's fairs), where trained resource persons demonstrate creative, child-centered activities. The *balmelas* also aim to increase enrollment. About 32,000 *balmelas* have been conducted; these are followed by the establishment of Joyful Learning groups, which encourage teachers to adopt the new child-centered activities in their classrooms.

The UNICEF-sponsored Teacher Empowerment Project began in 12 tribal blocks of Dhar district in Madhya Pradesh in 1992 and has since spread to Rajasthan, Maharashtra, and Uttar Pradesh. The project, which involves teachers, administrators, and DIET and SCERT faculty, provides teacher training, school-level resources, and administrative support. Participating teachers typicenters, who provided residential training to primary teachers, head teachers, and cluster resource teachers. The cluster resource teachers provided monthly training to teachers, while also facilitating the exchange of experience and organizing demonstrations of good practices. The cluster resource teachers also visited schools in their cluster to support teachers in using newly learned practices. Ten DIETs, 173 block resource centers, and about 1,500 cluster resource teachers delivered the program in the field. All primary teachers and head teachers in project districts have completed the first cycle, and feedback from this cycle is being used in designing the second cycle of training.

The second cycle focuses on improving students' language competencies, particularly their reading competencies. This cycle will use the "whole school approach" to improve the effectiveness of primary schools. Good teachers identified in the first cycle of training were involved in writing supplementary reading material in Hindi for grades 1–5. This material is based on the active learning approach, which encourages children to read, think, create, and express. A teacher training manual was also prepared with teacher involvement. The material is being tested in trials.

Large-scale implementation of in-service training using a cascade delivery mode has inherent problems of quality control. It requires continuous monitoring and review of material and strategies and the use of feedback to improve the design and implementation of training. The external evaluation that is under way to assess the program's effectiveness will complement the concurrent internal monitoring and evaluation.

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cally receive one day of motivational training, guidance in preparing learning materials, and monthly follow-up sessions at the school cluster level. Each participating school receives Rs500 from UNICEF for purchasing materials to make learning aids and Rs2,000 from community *panchayat* funds for improving its facilities. Block and district education officers and other administrators work together to overcome bureaucratic red tape. Preliminary evaluations and observations have found that the program improves the school environment and boosts teachers' morale, self-esteem, and will to improve teaching, which, in turn, boost student enrollment and attendance.

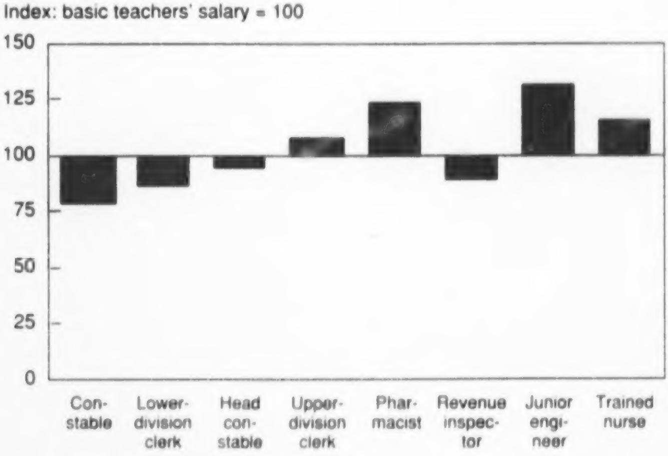
How Are Teachers Motivated?

In India the lack of appropriate incentives for good teacher performance could be the most serious challenge to improving education outcomes. Salaries, often considered an important source of incentive, do not appear to be a strong motivator of performance. Teacher salaries are comparable to those of other public employees with similar qualifications. Furthermore, at 3.6 times the average per capita income, primary teachers' salaries in India are relatively better than those in such middle-income countries as Chile, Costa Rica, and Thailand, although worse than in other low-income countries such as Kenya, Malawi, and Zambia (Lockheed and Verspoor 1991). Although teachers' salaries are competitive with those for other government occupations requiring similar levels of education and training (see figure 6.2), primary teachers perceive their economic status as low and feel that their incomes fall short of their families' needs (Jangira, Singh, and Yadav 1995a).

The states establish the salaries of primary teachers separately, although most follow central guidelines for both scales and increments. Scales are determined by a combination of formal education, training, and experience. According to Planning Commission data for 1994, entry-level salaries for untrained

Teachers' salaries are comparable to those of other government workers with similar qualifications.

FIGURE 6.2 SALARY DIFFERENCES BETWEEN TEACHERS AND SELECTED OTHER GOVERNMENT EMPLOYEES, INDIA, 1994



Source: India, Tenth Finance Commission, 1994.

teachers are equivalent to those for such other government occupations as head constable, upper-division clerk, and revenue inspector (see appendex C, table C.6). Junior engineers, pharmacists, and trained nurses are paid at a higher scale, and constables and lower-division clerks are paid at a lower scale. Entry-level salaries for trained teachers are only slightly higher than those for untrained teachers (Rs90 higher in Karnataka, Rs250 higher in Gujarat). The maximum salary for a trained teacher, attained after 16–20 years of service in most states, is three to four times the entry salary, net of the dearness allowance, which was 116 percent on average in 1995. Moreover, most states provide nonsalary benefits, such as a fixed medical allowance or reimbursement of medical expenses and advances for building a house and purchasing a conveyance, as well as retirement benefits (pension, gratuity, and group insurance).

Where Do the Problems Lie?

Studies of learning achievement among primary school students in India have often linked low achievement to weaknesses of the teaching force: poor subject mastery, limited teaching skills, and high absenteeism. These weaknesses, in turn, can often be linked to problems in teachers' preparation—pre-service and in-service training—and to their working conditions, which provide poor performance incentives.

Lack of Knowledge

Despite relatively high levels of formal education, training, and experience, many teachers have little understanding of the material they teach. Many primary teachers have not studied such core subjects as mathematics or the language of instruction beyond grade 8 or 10. In low-literacy districts in Assam, Madhya Pradesh, and Orissa a large share of primary teachers studied these key subjects to grade 8 only, and virtually all primary teachers completed their formal education in these subjects by grade 10 (see table 6.2). Research shows that teachers with 12 years of mathematics education are more effective than those with fewer (chapter 4), yet mathematics is an optional subject for prospective teachers in grades 11–12.

Pre-service training courses provide prospective teachers little more opportunity for improving their subject mastery, which is largely controlled through scores on admission tests or secondary school graduation examinations. For example, three curricula—the NCERT model pre-service primary teacher training course syllabus and actual course syllabi from Haryana and Delhi—devote less than 10 percent of the instructional program to the study of either content or teaching methodology for any primary-level subject (see table 6.3).

TABLE 6.2 TEACHERS WHO HAVE STUDIED MATHEMATICS OR LANGUAGE OF INSTRUCTION TO GRADE 8 OR 10 ONLY IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percent)

	Grade 8		*Grade 10*	
State	*Mathematics*	*Language*	*Mathematics*	*Language*
Assam	28	28	69	52
Haryana	1	1	96	85
Karnataka	1	1	92	67
Kerala	1	1	86	70
Madhya Pradesh	52	8	31	17
Maharashtra	7	7	89	79
Orissa	20	13	58	51
Tamil Nadu	4	4	62	47

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

The omission of advanced subjects in pre-service training contributes to primary teachers' weak understanding of the subjects they teach. One study of primary teachers in Tamil Nadu found that only 39 percent of rural and 53 percent of urban teachers could correctly answer four of five problems on a short mathematics test, the most difficult of which required finding the sum of two fractions with a common denominator and finding the perimeter of a polygon with given dimensions (Bashir 1994). In a study in Madhya Pradesh, teachers were administered the same tests of reading and mathematics as were administered to students in the DPEP baseline surveys. About half the teachers could not answer correctly a mathematics question on multiple factors and could not identify the central idea in a paragraph that they read (Gupta 1995b). Significant deficits in teachers' knowledge of mathematics, environmental studies, and Kannada language have also been reported in Karnataka.

Pre-service education also provides prospective teachers little practical training in child development. Although educational psychology courses cover the social, emotional, and physical development of children and general principles of learning, they provide little opportunity for observing children's behavior and applying general principles of learning. Educational psychology courses also neglect school readiness issues. Yet an understanding of child development is crucial to improving the educability of first-generation learners and to designing interventions to compensate for home environments that do not prepare children for schooling.

TABLE 6.3 SHARE OF PRE-SERVICE TEACHER TRAINING CURRICULUM DEVOTED TO SELECTED TOPICS, INDIA, SELECTED YEARS, 1987–92
(percent)

Training area	*Haryana, 1987*	*Delhi, 1995*	*NCERT, 1992*
Content and methodology			
Language	10	6.6	5
Mathematics	10	6.6	5
Science	10	6.6	5
Social studies	10	6.6	5
Practice teaching	6	16.7	20
Theory	45	36.7	25
Other[a]	9	20.0	35
Total time (hours)	2,000	1,500	1,500

a. Includes work experience, health and physical education, and practical work other than practice teaching.

Source: NCERT 1992a; SCERT 1995; Haryana Department of Education 1987.

Teachers' weak subject mastery cannot be attributed solely to pre-service training. Many teachers have less than a complete secondary education. According to the Fifth All-India Education Survey, in 1986, 18 percent of primary teachers had received no more than a middle-level education (grade 8), 72 percent had been educated through grade 10, and only 10 percent had completed 12 or more years of general education. The educational attainment of upper primary teachers (typically grades 6–8) was higher, with 45 percent having been educated through grade 12. More than half the teachers in a sample from low-literacy districts in eight states had received 10 or fewer years of general education (see table 6.4).

With many older teachers expected to retire soon, the share of teachers with fewer than 12 years of education should rapidly diminish during this decade. Attention could then be paid to improving the quality of pre-training general education that prospective teachers receive.

Lack of Teaching Skills

Beyond mastery of the subject matter of instruction, teachers need to have a wide range of teaching skills to be effective. Reflective practices and collaboration, for example, make teachers more responsive to diverse student needs in the classroom (Jangira 1995b; Jangira and Jangira 1995), while mentoring student progress boosts learning (Saxena, Singh, and Gupta 1995). And in

TABLE 6.4 GENERAL EDUCATIONAL ATTAINMENT OF TEACHERS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993
(percent)

State	*10 years or less*	*12 years*	*College*
Assam	80	16	5
Haryana	83	9	7
Karnataka	56	28	16
Kerala	46	35	19
Maharashtra	80	7	13
Madhya Pradesh	20	44	36
Orissa	66	11	23
Tamil Nadu	46	35	19
Total	60	23	17

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

India teachers need—but do not receive—preparation for teaching in the situation that two-thirds of them have to face: multiage, multilingual, multigrade classrooms, with many first-generation learners who attend school irregularly.

Pre-service teacher training does not provide teaching practice and skills development sufficient to meet teachers' needs, however. The NCERT model curriculum for primary pre-service training allocates less than 20 percent of the program to practicing teaching and 20 percent to developing pedagogical skills.

As a result, the repertoire of teaching skills among primary teachers is limited and, particularly in poor, rural areas, weighted toward practices that do not encourage active student learning: lecturing, oral reading, and copying. An observational study in eight schools in Bombay found that primary teachers devoted about two-thirds of lesson time to having all pupils work on the same task and a large share to lecturing to the entire classroom (Black and others 1993). And an observational study in Haryana found that over the course of an entire lesson teachers in primary classrooms did not ask a single question requiring students to use cognitive skills more complex than recall or recognition (Jangira and Dhoundyal 1981).

A third observational study in two poor, rural areas in Madhya Pradesh found that less than 10 percent of the observed teachers "very often" promoted student participation through a "question and answer" pedagogical approach. In more developed areas about 50 percent of teachers "very often" used this approach (Govinda and Varghese 1993). Teachers in the poor areas also read from a textbook and had students read from a textbook much more often than those in the more developed areas. In addition, these teachers paid little attention to student activity and failed to provide clear explanations to students. And less than half the teachers in the poor areas gave frequent classroom assignments, compared with more than three-quarters of the teachers in the more developed areas.

A survey of teachers in low-literacy districts in eight states confirmed these observations. Most teachers reported spending the largest share of classroom time lecturing to the entire classroom (33 percent) or supervising students taking notes (15 percent). Teachers reported spending little time supervising students working in small groups (10 percent on average) or providing correction and feedback (12 percent), two teaching practices considered to be effective in boosting learning (see table 6.5).

Teachers are often aware of the inadequacy of pre-service training. A survey of teachers' opinions on pre-service training found high levels of dissatisfaction among teachers in rural schools in Haryana and Kerala. In Kerala 40 percent or more of teachers expressed dissatisfaction with all aspects of pre-service training: teaching of theory, practice teaching, fieldwork and practical work, the quality of the instructional staff, the quality of the textbooks, and the quality of the library and audiovisual equipment (Jangira, Singh, and Yadav 1995a, 1995b).

Poor Teacher Motivation

Research suggests that teachers in India are poorly motivated, as reflected in absenteeism and self-reporting. In the DPEP baseline studies, many grade 4 or 5

TABLE 6.5 TEACHERS' CLASSROOM PRACTICES IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(unweighted average)

Teaching practice	*Average number of minutes per day*	*Average percentage of instructional time*
Giving exercises to classroom	38	13
Lecturing	95	33
Maintaining discipline	21	8
Providing correction and feedback	35	12
Supervising students taking notes	42	15
Supervising students working in groups	30	10

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

children in low-literacy districts in eight states reported that their teacher failed to come to school every day (see table 6.6). Less than two-thirds of students had teachers who came to school every day in Assam, Haryana, and Madhya Pradesh.

One reason for absences may be that teachers' choice of placement rarely influences their posting. About 40 percent of teachers work in schools to which they were transferred on administrative grounds. In Maharashtra, for example, the policy is to post teachers at least 25 kilometers from their residence, to encourage them to remain in the school's locale during the week rather than commute daily. But because many schools lack housing for teachers, the policy leads to greater absenteeism (Jangira, Singh, and Yadav 1995a, 1995b). Absenteeism may also result from teachers' engagement in such administrative duties as supervising elections, participating in census operations, conducting family planning drives, and collecting data at the behest of the district collector.

Despite poor attendance, teacher attrition is not a serious problem in most states, averaging 1.6 percent a year in primary and upper primary schools (NCERT 1992b). But in some states it is significantly higher: 3.0 percent in Gujarat, 3.1 percent in Andhra Pradesh, 3.8 percent in Rajasthan, 3.9 percent in Kerala, and 4.9 percent in Chandigarh.

Internationally, a number of factors have been linked with high absenteeism and low motivation among teachers. Most important are poor working conditions, low perceived status, and limited opportunities for career advancement and promotion (Lockheed and Verspoor 1991). Improving the incentives for good performance—including regular attendance—is an important chal-

TABLE 6.6 TEACHERS' ATTENDANCE IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percent)

State	*Grade 4 or 5 students whose teacher comes to school every day*
Assam	58
Haryana	62
Karnataka	89
Kerala	99
Maharashtra	81
Madhya Pradesh	61
Orissa	76
Tamil Nadu	92

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

lenge in India. Even highly skilled teachers are ineffective if they are not regularly present at school.

Poor Working Conditions

Working conditions for primary teachers are often poor, particularly for teachers in poor rural districts. As noted elsewhere in this book, many classes lack classrooms, and those that do have them must often contend with crowding and a lack of furniture and instructional materials. Electricity, toilet facilities, and safe drinking water are seldom found in rural schools (see table 6.7). Many teachers commute to work, and nearly a third must travel—by foot, bicycle, or other means—for an hour or more to reach school. Only 10–20 percent of teachers report receiving academic help from others.

Teachers perceive many problems in their teaching environment. Four-fifths perceive multigrade teaching as a problem, nearly half view the curriculum as heavy, and two-thirds report high student absenteeism and apathy among parents toward education. More than four-fifths report a lack of teaching aids, and a similar number report a lack of physical facilities. Nearly two-thirds of female teachers report the absence of separate toilet facilities and difficulty in getting secure housing as problems. And about 10 percent of female teachers report harassment from male head teachers (Jangira, Singh, and Yadav 1995a, 1995b).

TABLE 6.7 WORKING CONDITIONS FOR TEACHERS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(percent)

State	*Schools with safe drinking water*	*Schools with toilet facilities*	*Schools with chairs for teachers*	*Schools with electricity*	*Grades in pukka buildings*	*Grades with class-rooms*	*Schools with multigrade classes*
Assam	21	10	81	0	22	43	59
Haryana	76	57	92	27	56	81	59
Karnataka	41	9	65	26	68	77	62
Kerala	36	65	65	27	65	105	1
Maharashtra	36	20	85	26	46	73	56
Madhya Pradesh	34	16	61	10	57	56	83
Orissa	26	8	85	16	60	58	69
Tamil Nadu	61	9	73	21	60	46	62

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

Low Perceived Status

As in most countries, the status of primary teachers is low in India. Significant predictors of positive perceptions among teachers of their professional status include social and economic status, academic guidance and help from other teachers, a desire for more in-service training, and the frequency of staff meetings (Jangira, Singh, and Yadav 1995a, 1995b). A study of teacher motivation in India looked at some of these factors, asking teachers about their perceptions of their status in the community and factors they considered important in gaining status. About four-fifths of teachers perceived their professional status as low or only moderately high. More than half the teachers surveyed in low-literacy districts of Assam, Haryana, Madhya Pradesh, and Orissa and a quarter in other states reported a decline in their social status, which they attributed to salary and service conditions and governments' attitude toward primary teachers.

Teachers in most of the low-literacy districts cited "good performance of students in studies and sports" as important in achieving reasonable social status in the community. Less than half these teachers reported high acceptance as leaders in the community. Only about a fifth of teachers were satisfied or moderately satisfied with their economic lot, and about a third had been able to afford to build a house since becoming a teacher.

Limited Opportunities for Career Advancement and Promotion

Primary teachers have almost no avenues for promotion. A recent survey of teachers found that about four-fifths rated their chances of promotion as "bleak" (Jangira, Singh, and Yadav 1995a, 1995b). About 10–15 percent of teachers can expect to become a head teacher, a position offering slightly higher pay. But this prospect is not a good performance incentive because promotion is based on seniority alone. Of the teachers surveyed, only those with long experience expected to be promoted to head teacher or to pass the "selection grade" barrier for receiving a higher salary. The only other route for advancement for a primary teacher is to move into secondary teaching, a route that results in the attrition of the most motivated teachers from primary education.

Underrepresentation of Disadvantaged Groups

Teachers are male, relatively advantaged, and come from higher caste groups than their students; few teachers come from tribal backgrounds. This mismatch may have important consequences for the quality of classroom interaction as teachers adopt more student-centered teaching approaches. It may also limit the effectiveness of teachers as positive role models for some of their students.

What Are the Strategies for Improving Teacher Performance?

India's strategy for improving the quality of primary teaching focuses principally on providing in-service teacher training—through DIETs, capacity-building at the national, state, and district levels, and pilot programs supported by NGOs and donors. This is a first step, but systemic reform is needed. It could begin with a reevaluation of the need for lengthy pre-service teacher training in the light of higher general education among prospective teachers. It could also address the crucial issues of increasing teachers' performance incentives in small, widely scattered rural schools and improving teachers' working conditions. And it could consider ways to increase the representativeness of the teaching corps without reducing quality.

Improving Teachers' Preparation and Skills

Five strategies could be considered for improving teachers' preparation and skills. The first is to sustain the trend toward 12 years of pre-training general education for primary teachers. This program of general education could be made more rigorous, and entrance into teacher training institutes could be based on a standards-based screening process.

A second strategy is to concentrate both pre-service and in-service teacher training on improving teachers' repertoire of teaching skills. This will require strengthening the capacity of primary teacher training institutions to provide this training. The faculty of these institutions typically lack experience in primary education, whether as teachers or researchers. Teacher educators typically hold secondary rather than primary teaching degrees and therefore have taught only at the secondary level. And the research tradition in India has not supported the concentrated study of primary education, particularly research on classroom practices.

Without primary-level teaching or research experience, particularly in rural schools, teacher educators are poorly prepared to educate. Moreover, they do not use a full range of active learning approaches even though research has shown that student teachers learn effective pedagogical approaches only when these approaches are demonstrated and used during their training (Jangira and Ahuja 1994; Ainscow 1994; Jangira 1995a, 1995b). The reorganization of the NCERT and the recent initiative by some university departments to produce graduates specializing in primary education could help overcome this deficiency in research and practical experience among teacher educators.

A third strategy is to shorten the duration of pre-service teacher training to take into account teachers' higher level of general education. Offering one year of intensive training in primary pedagogy instead would increase the number of trained teachers available.

A fourth possibility is to offer primary education as a major in the three-year university arts and science courses, as Delhi University now does, and to award a degree rather than a certificate or a diploma. The cost-effectiveness of Delhi University's course should be compared with that of the course run by the DIETs.

A fifth strategy is to shorten the time between a teacher's completion of pre-service training and his or her posting to a position, as a way to improve the quality of teaching and learning and to minimize waste. In several states—Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, and Uttar Pradesh—the yearly output of teachers from elementary teacher training institutes far exceeds the number of available positions. In some of these states teachers wait 8 to 10 years for a job, often forgetting what they learned during pre-service training. The resources spent on their training are wasted.

Some Indian educators argue that the entire policy on pre-service teacher training needs to be reconsidered to take into account the imbalance between supply and demand in some states. They suggest recruiting grade 12 graduates from the national open market (where supply exceeds demand by, about 10 percent), posting them to the schools where they will be required to work to expose them to the sociocultural milieu, and then sending them for training to DIETs and other elementary teacher training institutes. The National Council for Teacher Education, established through an act of Parliament in 1993, is reviewing teacher education in India (National Council for Teacher Education 1996). This review should cover these issues, particularly the quality of training, its alignment with requirements of teachers in actual school conditions, and its compliance with standards for physical facilities and staff.

In-service training will need to be reformed and reconceptualized as professional development. Teachers could assume more responsibility for identifying their professional development needs. Block and cluster resource centers, which use master teachers in the professional development of other teachers, could bring training closer to the classroom. Advanced certification and licensing could recognize skills acquisition.

Improving Teachers' Motivation through Performance Incentives and Better Working Conditions

The present system of teacher compensation and supervision, coupled with poor working conditions and weak in-service training, provides few incentives for teachers to improve their performance. And if teacher performance does not improve, neither will student learning achievement.

Incentive programs need not center on monetary rewards. They could include a range of intrinsic rewards, such as special recognition, more authority over decisionmaking at the school level, or greater opportunities for travel or training. The key is to reward effective teaching and to discourage "defective" teaching (Hanushek 1994).

Implementing incentive systems is not easy. Internationally, as well as in India,

> developing and employing incentive structures . . . requires both extensive experimentation and evaluation of the results. Failures and misstarts are inevitable, given the lack of experience with such schemes. The full advantages may come only after a substantial number of new teachers and school personnel, with skills different from those currently plentiful in the schools, have been induced to enter teaching. Nonetheless, performance incentives remain the best hope for getting on a path of long-run improvement. (Hanushek 1994, p. 88)

One way to attract and retain good primary teachers might be to expand opportunities for career development, possibly by creating positions for master teachers and making these master teachers eligible for promotion to DIETs on the basis of performance.

Teacher compensation policy is the responsibility of the national and state pay commissions and is beyond the scope of this study. But other strategies for introducing performance incentives could be explored, including strategies that rely on village education committees and *panchayati raj* institutions. These local institutions could monitor teachers' attendance and provide recommendations for recognition or training opportunities.

State and centrally sponsored schemes have begun to address working conditions for teachers. Operation Blackboard, which focused on eliminating single-teacher, single-classroom schools, addressed teachers' isolation. The consolidation of multiple small schools, which is being planned as school mapping exercises begin to identify opportunities, should also help. Continuation of the DPEP's efforts in support of the repair of school buildings, construction of toilets, and other improvements in facilities could improve teachers' perceptions of their working conditions.

Matching Teachers with Students

Teachers often are more effective with students who share their characteristics. Female teachers are more effective with female students: as chapter 5 shows, the gender gap in learning achievement is smaller in schools with a higher share of female teachers. And teachers who share the ethnic background and language of their students are more effective than teachers who do not.

Recruiting female teachers for rural primary schools is a particular need: fewer women are interested in rural teaching assignments than in urban assignments because of concerns about harassment and lack of facilities. Improving facilities and working conditions is thus necessary to increase the attractiveness of primary school teaching to women, especially in rural areas.

The issue of harassment as a deterrent for female teachers considering rural positions also needs to be addressed. One possible solution is to employ educated married couples as teachers in small rural schools. Another is to recruit women married to male teachers already posted to rural schools. Most teachers in low-literacy districts are married men, and about 13 percent are married to women with more than 10 years of education. Recruiting these women as teachers could increase the percentage of female teachers in low-literacy districts.

Matching scheduled caste or scheduled tribe teachers with schools whose student populations are predominantly scheduled caste or scheduled tribe may prove more difficult because of the sheer number of these students. But some states have been able to recruit scheduled caste and scheduled tribe teachers, and their strategies could be used as models by other states.

CHAPTER SEVEN

Improving the Quality of Textbooks and the Efficiency of Their Production

Virtually all primary students in India have textbooks, and many receive them at no cost—a substantial accomplishment for a system enrolling more than 100 million students and operating under severe budgetary constraints (see table 7.1). But recent studies have begun to highlight concerns about both quality and efficiency. They suggest that the readability of many textbooks is low, the physical quality of textbooks is often poor, and children in many states carry too heavy a textbook burden.[1] The studies have also revealed the need for more efficient production and distribution of textbooks.

The solutions to many of these issues can be found in India. Studies have found good practices in place in one state or several in most aspects of textbook development and publishing. And cross-state comparisons suggest ways to improve the efficiency of textbook publishing. For example, per page manufacturing costs vary by more than 100 percent across six states; large potential savings realized from more efficient publishing could be directed to improving the quality of textbooks. Setting quality and physical standards, improving development and production processes, increasing the private sector's role in printing and publishing, and introducing competition could all help in getting better-quality books into the hands of all primary students.

Sustained provision of good-quality textbooks could be one of the most important education investments for India's governments. The principal instructional aid in India's primary schools (supplemented in many rural schools only

TABLE 7.1 STATE POLICIES ON SUBSIDIZED TEXTBOOK PROVISION FOR PRIMARY STUDENTS, 13 MAJOR INDIAN STATES, 1996

State	*Boys*	*Girls*	*Scheduled caste*	*Scheduled tribe*
Andhra Pradesh	No subsidy	Free	Free	Free
Assam	No subsidy	Free	Free	Free (language textbooks only)
Bihar	No subsidy	Free	Free	Free
Gujarat	No subsidy	Free	Free	Free
Haryana	Free for 10 percent of economically weaker	Free for 10 percent of economically weaker	Free for 10 percent of economically weaker	Free for 10 percent of economically weaker
Himachal Pradesh	No subsidy	Free	Free	Free
Karnataka	Free	Free	Free	Free
Kerala	No subsidy	Free	Free	Free
Madhya Pradesh	No subsidy	Free for other backward castes	Free	Free
Maharashtra	No subsidy		Free	Free
Orissa	No subsidy	Free	Free	Free
Tamil Nadu	No subsidy	Free	—	—
West Bengal	Free	Free	Free	Free

— Not available.

Source: DPEP Bureau, personal communication, 1996.

by a blackboard), textbooks carry the primary curriculum for students and teachers alike, and for most students they are the sole available reading material.[2]

Textbook publishing in India is a very large enterprise that has focused on keeping textbooks affordable. For example, in six DPEP states studied intensively, textbook publishing for elementary grades 1–8 in 1993–94 was a $33 million business, distributing nearly 180 million books at prices that are very low by international standards—about Rs8 each, or $0.25.

Some textbooks are developed nationally by the NCERT, but textbook publishing is almost entirely in the hands of state agencies, with varying degrees of participation by the private sector. Most states publish all textbooks within the state and do not offer any choice of titles for subjects taught at the primary level. Although states prefer to write, illustrate, design, print, and distribute textbooks for most of their schools, there are exceptions. Several smaller states in the northeast that lack publishing resources buy titles from private publishers, and West Bengal recommends private publishers' titles for use throughout much of its education system. Several states use private publishers' titles in grades 9 and above because relatively small quantities of a relatively large number of specialized titles are required and the states do not have the resources to prepare them.

The number of textbook titles produced in a state depends on three factors: the number of subjects, the number of grades (including nonformal education), and the number of languages in which these subjects are taught. Comparison across states is difficult, but it is estimated that states publish from 100 to more than 600 textbook titles (see table 7.2 for DPEP states). The greater the number of titles, the greater the problems in developing manuscripts and managing production and distribution and the greater the need for professional staff and appropriate tools.

TABLE 7.2 TEXTBOOK TITLES IN USE, 10 MAJOR INDIAN STATES, 1994–95

State	*Number of titles*
Andhra Pradesh	67
Assam	140
Bihar	102
Haryana	14
Karnataka	104
Kerala	50
Madhya Pradesh	139
Orissa	21
Tamil Nadu	98
Uttar Pradesh	31

Source: Rao and Cohen 1994.

Virtually all states prepare textbooks in mathematics, environment, science, and language. States also prepare textbooks in multiple languages, to meet the needs of their diverse student populations.

Improving Textbooks to Meet Needs

India has completed the first two major steps toward more effective use of textbooks to improve learning. Institutional capacity for developing and publishing textbooks has been established in all but the smallest states. And in recent years nearly all states have delivered textbooks on time to most students. This is a solid base of accomplishment on which further efforts can build.

One area that deserves high priority is enhancement of the instructional impact of textbooks. Here, three efforts are key: improving the readability of textbooks, reducing the textbook load for schoolchildren, and improving the delivery of textbooks in minority languages to the students who need them.

Easing Readability

Increasing evidence shows that children have difficulty reading their textbooks. A study of readability in Rajasthan found that the vocabulary in textbooks was too difficult (Sharma 1993). In general, children used in their normal speech less than 20 percent of the words in the textbooks. The textbooks also reflected poor instructional design, repeating only about 5 percent of words 10 or more times and using more than 350 words only once.

School effectiveness studies in Uttar Pradesh found that grade 2 students had not acquired the reading competencies required to read the grade 2 textbooks in arithmetic and Hindi. Sentences in the textbooks averaged 20 words, far too many for children at that stage of development. In arithmetic, while most students still had difficulty with basic number concepts, the grade 2 textbooks used such abstract concepts as "the divisor." Field observations showed that most of these students were unable to use their textbooks (Bashir, Ramakrishnan, and Sharma 1993). And only 20 percent of grade 3 teachers interviewed by Kaul and her colleagues reported that their students directly used arithmetic textbooks (Kaul and others 1995a).

In *Learning without Burden*, Pal (1993, p. 8) notes, "The problem of readability in textbooks becomes grim," citing, as an example the following excerpt from a grade 5 mathematics text, which even a reader familiar with the process it attempts to explain would find challenging: "We find that while dividing a decimal by a multiple of 10,000 or 1,000, we first move the decimal point to the left as many places as there are zeros in the number and then divide the resulting decimal by the second factor of the divisor."

A 1995 study of the readability of primary textbooks by the NCERT and the Central Institute of Indian Languages provides a more comprehensive view of textbooks in six states (Kaul and others 1995a). The study evaluated grade 3 language, mathematics, and environmental science textbooks on readability criteria that measure the level of language and syntax. A sample of 1,010 students using these textbooks completed comprehension tests, and teachers using the textbooks were interviewed.

The results revealed striking differences among the states in student comprehension of textbooks (see table 7.3). All students in the rural sample in

TABLE 7.3 TEXTBOOK READING COMPREHENSION FOR GRADE 3 STUDENTS, SIX INDIAN STATES, 1995

(percentage of students scoring at least 50 percent correct)

State and student group	*Sample size*	*Language*	*Mathematics*
Assam			
Urban	82	95	60
Rural	41	61	73
Tribal	23	74	48
All	146	82	62
Haryana			
Urban	80	72	19
Rural	64	11	3
All	144	45	12
Karnataka			
Urban	80	43	39
Rural	70	59	86
Tribal	30	17	20
All	180	46	36
Kerala			
Urban	50	56	54
Rural	50	78	86
Tribal	30	100	87
All	130	65	74
Maharashtra			
Urban	100	92	85
Rural	100	100	100
Tribal	80	72	84
All	280	89	90
Tamil Nadu			
Urban	50	94	100
Rural	50	84	84
Tribal	30	10	13
All	130	71	74

Source: Kaul and others 1995a.

TABLE 7.4 RESULTS OF LINGUISTIC ANALYSIS OF GRADE 3 LANGUAGE AND MATHEMATICS TEXTBOOKS, SIX INDIAN STATES, 1995

		Language textbooks					*Mathematics textbooks*				
		Words by class (percent)			*Compound sentences*		*Words by class (percent)*			*Compound sentences*	
State	*Sample size*	*Nouns*	*Adjectives/ adverbs*	*Verbs*	*Share (percent)*	*Average number of words*	*Nouns*	*Adjectives/ adverbs*	*Verbs*	*Share (percent)*	*Average number of words*
Assam	146	58	12	30	6	10.5	51	17	32	0	—
Haryana	144	51	30	19	8	14.0	63	24	13	19	16.0
Karnataka	180	54	11	35	10	9.0	72	3	25	11	10.0
Kerala	130	61	21	18	0	—	42	36	22	19	12.4
Maharashtra	280	45	31	24	5	10.8	54	19	26	2	9.6
Tamil Nadu	130	51	17	32	0	—	61	21	18	0	—

— Not available.

Note: The analysis examined a sample of pages randomly selected from textbooks.

Source: Kaul and others 1995a.

Maharashtra answered more than half the language comprehension questions correctly, while in Haryana only 11 percent of rural students did. There was a similar gap for the mathematics test. Nontribal students in Maharashtra and Tamil Nadu, both urban and rural, scored comparatively well on both language and mathematics comprehension tests; tribal students performed less well in both states. The urban-rural differences in comprehension for both the language and the mathematics texts were smaller in Tamil Nadu and Maharashtra than in the other four states, providing further evidence that average student comprehension of textbooks is significantly higher in these two states, probably because their textbooks are less difficult.

A linguistic analysis of the textbooks searched for patterns in word usage and grammar that might explain the differences in comprehension (see table 7.4). For both subjects the analysis found that the percentage of compound sentences in the text is inversely related to the test results, although the effect is stronger for mathematics. A higher percentage of verbs, which may indicate shorter, simpler sentences, is positively related to the test results.

The same analyses conducted for two environmental science texts arrived at similar findings. The language of these texts was found to be more technical and conceptual, a fact confirmed by teachers and textbook writers. Teachers often had to explain concepts in their own words. In multigrade teaching situations and with no teacher training in the use of these texts, this need was thought to lead to loss of accuracy in transmitting the concepts to the students.

Researchers also administered reading and writing tests to students for the 10 words most frequently used in the texts. Reading scores were higher than writing scores, and students had difficulty writing from dictation words that were not part of their vocabulary. Urban students in Karnataka and rural students in Assam and Haryana were able to write correctly only 4 to 6 of the 10 words. These findings are similar to those of Sharma (1993) for Rajasthan.

The evidence confirms that in many states the vocabulary and sentence structure of textbooks may be too difficult for students at the primary level. To improve readability, textbooks should avoid long, compound sentences. They should also use the children's vocabulary as much as possible. Shifting to a simpler vocabulary will require studies of children's natural vocabulary and the development and enforcement of guidelines for textbook writers.

Involving teachers in textbook writing could also be helpful. Teachers interviewed in the NCERT study of textbook readability suggested several ways to improve textbooks: reducing the number of lessons, organizing them in order of difficulty, minimizing the use of composite words and complex sentences, including more maps and illustrations, and generally making the material less difficult. Most also reported using the mathematics textbook as a teachers' guide rather than as a student textbook (Kaul and others 1995a).

Lightening the Textbook Load

The textbook load is heavy, both physically and cognitively. Data from a recent survey on the finances of textbook publishing show that students in elementary school are expected to carry up to half their body weight in books (Rao and Cohen 1995). Students in grades 1–3 are expected to carry anywhere from 2 to 10 kilograms of books; Pal (1993) found that students in the Delhi region typically carry about 4 kilograms of books. Since a typical Indian child of age 9 weighs about 22 kilograms, the textbook load can amount to 10 to 50 percent of the child's weight.

A greater textbook load does not mean greater learning. In all states in the five-state sample except Karnataka the number of textbook pages is negatively related to grade 3 language comprehension scores (Kaul and others 1995a; Rao and Cohen 1995).[3] In Assam and Maharashtra, the states with the highest language comprehension scores, students had substantially fewer textbook pages in the first three grades than the five-state average (see table 7.5). In Kerala and Tamil Nadu, which have lower language comprehension scores, students had substantially more textbook pages than the average.

Textbooks are not, or course, the only factor affecting learning. Other factors—teachers' performance, the number of textbook pages covered by the teacher, the amount of homework assigned, and the availability of auxiliary learning materials—affect the extent to which students learn to read all that they carry in their book bags. Karnataka's textbooks contain the fewest pages per grade of all five states. But as other studies show, Karnataka also ranks lowest among the states in the range of auxiliary learning materials provided, suggesting that in Karnataka insufficient learning materials may be a factor in low learning achievement.

States could reduce the number of textbook pages without necessarily threatening learning achievement, with attendant cost savings. As the analysis of efficiency in textbook publishing in this chapter suggests, such cost savings could help shift the allocation of textbook financing toward improvements in quality.

Cost savings could be substantial. Paper and printing costs account for about 90 percent of the cost of producing a book in India. Because these costs are directly related to the number of pages, cost savings would be nearly proportional to the reduction in pages. A 20 percent reduction in pages in Maharashtra, for example, would lead to savings of about Rs40 million.

In determining how many pages textbooks should have, and hence whether the author teams should be free to include as much material as they think fit or should be constrained to work within a set number of pages, several factors need to be considered:

TABLE 7.5 TEXTBOOK PAGES PER STUDENT, BY GRADE, FIVE INDIAN STATES, 1993–94
(A5 equivalent)

Indicator	*Assam*	*Karnataka*	*Kerala*	*Maharashtra*	*Tamil Nadu*	*Average*
Pages per student						
Grade 1	168	112	528	192	392	278
Grade 2	228	136	536	224	463	317
Grade 3	382	448	944	505	609	578
Grade 4	424	416	944	640	809	647
Grade 5	639	948	864	1,152	845	890
Grade 6	834	760	1,308	1,440	1,536	1,176
Grade 7	770	944	1,760	2,112	1,344	1,386
Grade 8	930	1,188	604	1,728	1,628	1,216
Total	4,375	4,952	7,488	7,993	7,626	6,487
Average for grades 1–8	574	619	936	999	953	811
Deviation from five-state average						
Grade 1	–110	–166	250	–86	114	n.a.
Grade 2	–89	–181	219	–93	146	n.a.
Grade 3	–196	–130	366	–73	31	n.a.
Grade 4	–223	–231	297	–7	162	n.a.
Grade 5	–251	58	–26	262	–45	n.a.
Grade 6	–342	–416	132	264	360	n.a.
Grade 7	–616	–442	374	726	–42	n.a.
Grade 8	–286	–25	–612	512	412	n.a.
Deviation from eight-grade average	–264	–192	125	188	142	n.a.
Deviation as a percentage of five-state average	–32	–24	15	23	18	n.a.

n.a. Not applicable.
Source: Rao and Cohen 1995.

- The selling price of the book, which must remain low
- The curriculum material that must be covered
- The average number of teaching days in the year
- The additional material that needs to be included in the textbook because teachers and children will not have access to other printed materials, such as

teachers' notes, supplementary reading material, questions and answers, and material for group work

- The demand of some teachers and parents that every topic be included even though there is little or no likelihood that all can be covered in the time available

- The page size, the type size, and the page layout.

There is no one recipe that each state should follow in reducing the size of textbooks, and innovative approaches should be encouraged. For example, in Bihar the core textbook for grade 1 contains 96 pages, 32 of which are notes for the teacher. This textbook could have a third fewer pages, and cost proportionally less, if a separate 32-page teachers' handbook were developed and supplied free to teachers.

Meeting the Needs of Diversity

In all states textbooks are developed in multiple languages to conform with constitutional requirements that students be offered instruction in their mother tongue. Haryana publishes its textbooks in 4 languages (English, Hindi, Punjabi, and Urdu), Andhra Pradesh in 8 (English, Hindi, Kannada, Marathi, Oriya, Tamil, Telugu, and Urdu), and Assam in 12 (Assamese, Bengali, Bodo, English, Garo, Hindi, Hmar, Manipuri, Mising, Nepali, Rabha, and Tai). In other states the number of languages ranges from 2 to 10 (see figure 7.1).

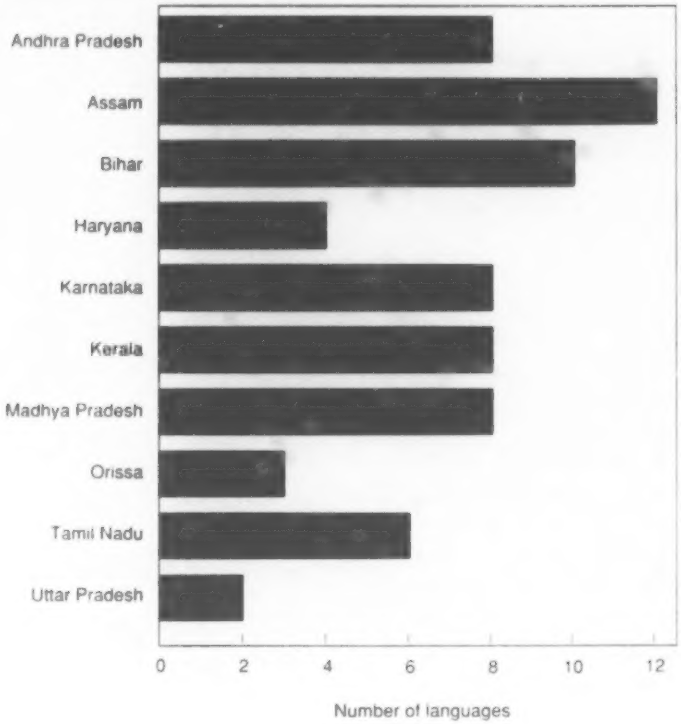
An availability survey shows that textbooks in minority languages often arrive late or not at all. In most states textbooks are first prepared and printed in a predominant regional language, and work on versions in minority languages often begins only after the majority language version has gone to press. States sometimes have difficulty preparing translations. And if the script of the language of translation differs from that used for the predominant language, they may have difficulty finding typesetters once manuscripts are translated.

Textbooks are translated into the languages spoken within states' borders, and the quantities required are often very small. Yet states rarely purchase textbooks in a minority language from neighboring states in which that language holds majority status. For example, Andhra Pradesh struggles to produce a limited quantity of books for its Tamil-speaking children even though neighboring Tamil Nadu produces the bulk of its books in Tamil.

States claim that they cannot purchase textbooks for their minority language groups from neighboring states because each state's curriculum is unique. That is undoubtedly true for social studies textbooks, but less so for mathemat-

States publish textbooks in up to a dozen languages.

FIGURE 7.1 NUMBER OF LANGUAGES IN WHICH SELECTED INDIAN STATES PUBLISH TEXTBOOKS, 1994–95



Source: Rao and Cohen 1994.

ics or reading textbooks. As national guidelines for minimum levels of learning are introduced, states will produce a new generation of textbooks with greater similarity to one another, increasing the possibilities for exchanges. These possibilities warrant exploration: a child would be better off with a textbook from a neighboring state than with no textbook at all.

Because the cost per copy of translating, producing, and distributing small quantities of minority language textbooks is disproportionately high, states use a form of cross-subsidy to maintain the same selling price for textbooks in majority and minority languages. This practice should be continued to avoid penalizing students who speak minority languages.

Developing Better Textbooks: The Process

In principle, the task of textbook development is to produce tools that enable teachers and students to cover the syllabus prescribed for a given subject or grade, involving teachers and students to ensure production of the most useful and appropriate tools. In practice in India, teachers and students are rarely involved. As noted in *Learning without Burden*, "The fact is that while the teachers' involvement in the preparation of syllabi and textbooks is verbalized as a matter of principle, in practice it takes the shape of token involvement of a handful of teachers. . . . [Moreover,] there is no established procedure or official forum to mobilize teacher vigilance and participation in curriculum improvement" (Pal 1993, p. 6).

The failure to involve teachers in textbook development in India may be one of the most important reasons for the poor quality of textbooks. Another reason is that textbook development rarely involves field-testing books with teachers and students. As a result, many corrections and improvements that would be identified through field tests go unnoticed. There is much scope for improving quality in the typical process for developing textbooks in India—a process that involves manuscript development, illustration and design, field-testing, revision, and preparation of camera-ready copy. One effort to improve textbook quality is described in box 7.1.

Getting the Right People

Manuscript development is often left in the hands of authors with little experience in primary education. In most states surveyed by Rao and Cohen (1994) responsibility for preparing the contents of textbooks rests with the SCERT or its equivalent and typically involves four sets of professionals. The first is the staff of the textbook office, the state institution responsible for textbook publishing—or, more often, a textbook board—which decides that a new or revised textbook is needed and requests the SCERT to undertake the work.

The second set of professionals is the writing committee. Most textbooks are written not by a single author but by a team or committee. This team may be made up of subject experts or, as in Karnataka, teachers. The team works together, often in a workshop, to prepare a draft manuscript.

The third team of professionals involved is the subject experts, called reviewers in many states, who vet the manuscript. The reviewers are sometimes

BOX 7.1 "TEXTBOOK RENEWAL": GIVING THE RIGHT PEOPLE THE RIGHT RESOURCES AND THE RIGHT TRAINING

In 1995 a series of national workshops was held under the title "Textbook Renewal." The participants came from the Ministry of Human Resource Development, the Technical Resource Group of DPEP, NCERT, the Regional Institutes of Education, and the SCERTS and DIETs of 10 major states.

During the workshops a comprehensive strategy was developed for the identification, orientation, and training of all those who are involved in any way in the development and production of instructional materials to strengthen the relationship between the teaching and learning process and the materials that are supposed to assist it (P. Cohen, personal communication, 1996).

The principal features of such a strategy are as follows:

- Identifying resource persons at all levels and involving them in regular workshops
- Setting up a resource network that includes institutions, NGOs, and individuals
- Assessing the needs for capacity-building in the institutions responsible for training
- Strengthening SCERTs and DIETs and providing them with collections of quality teaching and learning materials and reference books
- Identifying potential members of textbook creation teams, including teachers, writers, subject specialists, child development experts, illustrators, designers, and NGO members with field experience
- Holding competitions for writing sample lessons to help identify potential textbook writers
- Holding technical workshops on such topics as authority, illustration, editing, production, distribution, assessment, and field-testing of textbooks
- Ensuring that cost and production limitations are taken into account from the start of the process of textbook preparation
- Holding regional exhibitions of materials from all over India and abroad and inviting critical analysis of them by state teams.

Following the workshops, many of the states that shaped the strategy are now beginning to implement part or all of it. This is having a noticeable effect on the quality of new titles.

the SCERT staff responsible for curriculum development; these reviewers ensure that the new textbook matches the curriculum.

Finally, the manuscript is passed to editors. A commercial publishing house uses several categories of editor: a commissioning editor, who is responsible for finding authors and commissioning a book; a desk editor, who works with an author to improve the manuscript and may suggest major changes; and a copy editor, who proofreads the manuscript. In India the nearest equivalent to the desk editor in most states is the team of reviewers; most editors involved in preparing new and revised manuscripts for textbooks are copy editors. Some copy editors are experienced teachers, but because the reviewers have the final say on the substantive content of textbooks, copy editors rarely have the opportunity to apply their experience to improve a textbook.

The roster and roles of professionals involved in manuscript development vary from state to state. In some states the authors are subject specialists, and the reviewers are teachers. In others outside experts are called in to augment the curriculum specialists of SCERT. And in still others teachers are not involved in textbook development at all and can only provide feedback after books have been printed, distributed, and used in classrooms throughout the state. *Learning without Burden* recommends involving far more teachers in writing textbooks. The national textbook renewal workshops developed a comprehensive strategy for textbook renewal that includes identifying potential members of textbook creation teams: teachers, writers, subject specialists, child development experts, illustrators, designers, and NGO members with field experience.

In many states the SCERT or its equivalent prepares the manuscript without seeking the textbook office's expert advice, and the textbook office merely turns manuscripts into finished books and distributes them. Authors and reviewers are free to develop textbooks with as many pages as they wish, to provide illustrations that may or may not be appropriate, and even to stipulate type sizes. The method of paying authors can provide incentives for producing longer books. Payment by items, for example, in which a member of an author team might receive Rs150 for each item included in the final version of the book, is likely to inflate the size of the text.

Getting the Design Right

Two aspects of textbook production require expertise in design: preparing the illustrations and laying out the pages. Illustrations can be as important as the text. They should amplify the text and be clear, informative, interesting, and even entertaining. But too often, because of insufficient resources, textbook illustrations are none of these.

Sometimes textbook authors provide rough sketches of what is required. They might also provide illustrations cut from existing textbooks, which can lead to copyright problems. Occasionally the authors may even provide finished artwork.

If only a sketch is provided, the textbook office staff may commission an artist to produce finished artwork or subcontract the task to their printers. In either case, the fees are generally insufficient to ensure adequate quality. An illustrator might be asked to produce a full-page illustration for four-color printing for a fee of only Rs112.

The design of the textbook depends on the page size, which varies widely from state to state. States that no longer use letterpress printers have generally settled on a close equivalent to the international sizes of A4 (210 millimeters wide by 280 millimeters high) and A5 (148 millimeters by 210 millimeters). A4 is often used for grades 1–2, and sometimes for grade 3 as well, because a larger page is considered easier to read. Most letterpress machines are unable to print international sizes economically, so smaller pages are used for textbooks printed on these machines.

Although larger pages theoretically may be easier to read, their advantage is often lost. Poor book design frequently leads to overcrowded pages, with type sizes that are too small, lines of type that are too long, and illustrations that are unclear. A larger page can mean a shorter life span for a book: children roll large books up to swat at things, they fold and squeeze them into their school bags, and they use them to shelter themselves from the rain. And in a crowded classroom, a child may find it difficult to open fully an A4 book.

Field-Testing before Publication

Few states in India systematically field-test their textbook manuscripts (Rao and Cohen 1995). Field-testing is essential to ensure that students and teachers understand the text and the illustrations and to identify remaining factual errors, which can then be corrected before publication. Textbooks that are not field-tested cannot be revised until after the first edition has been published and introduced throughout the state, leading to frequent, ad hoc alterations. By allowing alterations to be made before books are widely distributed, regularly field-testing new textbooks would do much to increase the efficiency of textbook development.

Producing Camera-Ready Copy for Uniform Quality

Producing camera-ready copy, the final step in developing a textbook, ensures uniform quality. It guarantees that a textbook printed by different printers—the practice in Madhya Pradesh and Uttar Pradesh—retains the same standard of design quality. Another way for a state to maintain consistency is to print the textbook in a state-owned facility, the practice in Bihar, Haryana, Karnataka, Kerala, and Orissa. Although textbooks in some states are printed by letterpress printers, which typically have difficulty handling camera-ready copy, printers in most states use offset litho printing technology that enables them to work with camera-ready copy.

TABLE 7.6 PUBLIC AND PRIVATE ROLES IN PRIMARY TEXTBOOK PUBLISHING, 12 MAJOR STATES, INDIA

State	*Writing and design*	*Printing*	*Distribution*
Andhra Pradesh	Director of School Education, Textbook Press	Government and 19 private (L, O)	Government (cooperatives)
Assam	State Textbook Corporation	Private (146 L, 29 O)	Government and private
Bihar	State Textbook Corporation	Government and private (L, O)	Government (cooperatives) and private
Haryana	Department of Secondary Education	Government and private (148 L, 10 O)	Government and private
Karnataka	Directorate of Research, Training, and Textbooks	Government and private (O)	Government and private
Kerala	Department of General Education	Government and some private (O)	Government (cooperatives)
Madhya Pradesh	SCERT, State Textbook Corporation	Private (4 L, 35 O)	Government and private
Maharashtra	State Bureau of Textbook Production and Curriculum Research	Private (O)	Government and private
Orissa	SCERT	Government (L, O)	Government
Rajasthan	State Textbook Board	Private (O)	Government and private
Tamil Nadu	State Textbook Corporation	Private (110 O)	Government (cooperatives) and private
Uttar Pradesh	SCERT, State Textbook Office	Private (1,000 L and O)	Private

Note: O = offset printing; L = letterpress.

Source: Rao and Cohen 1995.

Improving Efficiency in Textbook Publishing

Improving the quality of textbooks could require greater resources. The following overview of textbook publishing in India identifies ways in which efficiency might be improved to generate the resources needed: increasing private participation, bringing manufacturing costs and sales prices in line, introducing competition and quality control in printing, having printers purchase paper, and improving distribution.

Most responsibility for textbook publishing lies in the public sector, with the textbook offices. The status of textbook offices varies from state to state. In some states the textbook office is a subsection of the department of education, charged with organizing the printing and distribution of textbooks. In these states it has no authority for preparing manuscripts or illustrations, which are the responsibility instead of the state institute of education or the SCERT.

In other states the textbook office is an autonomous corporation with control over its finances and staffing. Autonomous textbook offices may develop textbook manuscripts themselves or may supervise their development by others; they play the role of a state-owned publishing house, relying to a varying extent on the private sector for such services as printing.

Very few private publishers in India (three or four, by one report) have the capacity to develop and test all the titles needed to meet a single state's textbook requirements. Thus, textbook offices are likely to be needed for many years.

Exploring Greater Private Participation

The private sector is involved in a variety of developing, printing, and distributing activities (see table 7.6). In virtually all states listed in the table, public agencies control textbook writing and design, while the private sector is generally limited to printing and distribution. The state with the greatest private sector involvement is Uttar Pradesh, where all printing is done by the private sector and textbooks are distributed solely through private retailers. By contrast, in Kerala all aspects of publishing are managed by public or quasi-public agencies; these agencies are textbook cooperatives in each district that function as nonprofit wholesalers and retailers.

Greater involvement of the private sector in publishing, as in West Bengal, or in printing, as in Uttar Pradesh, could accomplish two important objectives: reduce the cost of textbook production through competition and improve the distribution of textbooks to areas that remain underserved.

Full privatization of textbook publishing is quite far off in India, and there is some misunderstanding of what full privatization entails. For example,

TABLE 7.7 TEXTBOOK MANUFACTURING COSTS AND SALE PRICES FOR GRADES 1–8, SIX INDIAN STATES, 1993–94

(rupees, unless otherwise noted)

State	*Number of copies printed (thousands)*	*Manufacturing costs (thousands)*				*Average cost per page (1)*	*Average price per page (2)*	*Average (subsidy) per page (3 = 1 − 2)*[a]	*Cost as a percentage of profit (4 = 1 / 3)*
		Text paper	*Cover paper*	*Printing*	*Total*				
Assam	21,300	60,682	5,525	21,626	87,198	0.0303	0.0473	0.0170	64.1
Haryana	7,885	41,682	3,116	10,226	55,024	—	—	—	—
Karnataka	40,289	—	—	—	208,810	0.0369	0.0512	0.0143	72.1
Kerala	20,803	111,514	16,054	53,126	180,694	0.0398	0.0295	–0.0103	134.9
Maharashtra	51,863	112,121	23,093	76,000	211,214	0.0259	0.0557	0.0298	46.5
Tamil Nadu	37,340	146,359	9,241	33,837	189,437	0.0313	0.0641	0.0328	48.8

— Not available.

Note: A5 equivalent pages.

a. A negative figure indicates a subsidy.

Source: Rao and Cohen 1995.

Karnataka has "privatized" its textbooks, contracting with publishers to print and sell textbooks in the state. But the publishers are not responsible for the books' contents, which continue to be prepared by the Directorate of State Educational Research and Training (DSERT). The books are still "state" textbooks. Karnataka's work with private publishers may nevertheless be an important first step toward greater public-private cooperation.

Bringing Manufacturing Costs and Sales Prices in Line

Information on the manufacturing cost of textbooks in India is limited, but available evidence suggests that the cost per printed page varies significantly across states (see table 7.7). The average production cost per page in Kerala is 165 percent of that in Maharashtra. In other states it ranges from 115 to 142 percent of the cost in Maharashtra.

Sales prices do not reflect these production costs. For example, the sales price per page in Kerala is the lowest in the six states for which data are available, even though Kerala's production cost per page is the highest. And the sales price per page is highest in Haryana, at 214 percent of Kerala's price per page, although the production cost per page is 72 percent of that in Kerala. Haryana, Maharashtra, and Tamil Nadu make a profit over manufacturing costs of more than 50 percent, while Kerala provides a 50 percent subsidy. (There are, of course, additional costs for administrative overhead, storage, and distribution.) This variation suggests the possibility of cost savings.

Some states use simple formulas to set the sales price of textbooks: for example, adding two-thirds to the manufacturing cost for imputed development, overhead, and distribution costs, discounts, and notional surplus. Other states have more complicated means of arriving at the price. But the formulas are less important than they might seem, for two reasons.

First, state authorities are generally reluctant to raise prices from one year to the next because textbooks are considered highly price sensitive. The price of textbooks is also a political issue, and many states subsidize textbook provision to ensure that prices do not rise. In practice, the selling price of a textbook is determined by what it sold for previously and what other states charge for similar titles. As a result, Indian textbook prices are extremely low by international standards and are substantially lower than the prices of equivalent private commercial publishers' titles on the home market. But studies have shown that parents and teachers nevertheless consider textbooks expensive.

Second, a textbook office rarely knows all the costs of textbook production. While the costs of paper and printing are easy to identify from the paper merchants' and printers' bills, the costs of manuscript development, textbook office publishing overhead, and book distribution are difficult to determine.

These costs are especially difficult to identify when the textbook office is a subunit of the state department of education. In this case salary costs, rental costs for office buildings and *godowns* (textbook storage sheds), and routine operating costs (electricity, telephones) are paid directly from department of education budgets and often are not identified as budget line items. Double subsidizing further obscures costs. In Kerala, for example, the government-owned printing plant that prints most of the state's textbooks is directly subsidized by the state government, so its printing and binding bills cannot be used as an accurate record of costs. More accurate estimates of costs can be obtained when the textbook office is a self-accounting corporation, as in Tamil Nadu.

In most states the state government is a major purchaser of textbooks because it provides some or all schoolchildren with free textbooks. The financial arrangements for government "purchases" differ from state to state, however. In some states, such as Tamil Nadu, the state government is treated like any other wholesaler and buys textbooks from the textbook office at agreed wholesale prices. This is quite practical when production costs are known. Private wholesalers can be charged a higher price than the government, to offset the public costs of distributing free textbooks to poor children.

In other states the government simply compensates the textbook office for the difference between its income and expenditures. In Bihar, where costs are far less well defined, the state government meets the textbook office's shortfall. But the state funding is always delayed, and the textbook office suffers from a permanent cash flow crisis. Facing similar problems, the textbook offices in Assam and Maharashtra are forced to raise short-term finance at interest rates of up to 20 percent.

To bring the price of textbooks into line with the cost of producing them, a textbook office has two clear requirements. First, it needs access to information on all costs of textbook publishing—from curriculum development costs to warehousing and distribution costs—and the authority to control them. Second, it needs the ability to control its own finances and enough funding to be self-sufficient. Any transaction related to supplying free textbooks or subsidizing the distribution system could then be financed through a prompt transfer of funds from the state government to the textbook office. Textbook offices, once established as self-accounting corporations, should operate on a no-profit, no-loss basis, using any surplus to improve the quality and variety of the textbooks they publish.

Introducing Competition in Printing

Encouraging government and private printers to compete with one another, even across state boundaries, would increase efficiency and improve quality in textbook manufacturing. Competitive procurement that takes into account printers' quality and reliability as well as their price would lead to a more efficient printing industry, both public and private.

Some states, such as Bihar, Haryana, Karnataka, Kerala, and Orissa, have government-owned printing presses that the textbook office is obliged to use. The capacity of these government presses is rarely sufficient to meet all of the state's needs, however, and the textbook offices contract part of the work to the private sector.

For those government presses, competing with the private sector will not be easy. In Kerala, for example, the state textbook printing plant, which carries out the bulk of the state's work, is substantially more expensive than private sector printers (possibly as much as twice as expensive). The plant also is unable to meet the textbook office's production schedules, and textbooks are rarely available by the start of the school year. In Karnataka the state printing plant in Mysore prints only a fraction of the state's textbooks. The textbook office is careful to place titles that are appropriate to the plant's resources and allows sufficient lead time to ensure that books are available on time.

Government presses are less efficient than private presses for several reasons:

- They have higher employee costs because they typically employ more staff than their private counterparts and give them more benefits.

- Their management finds it difficult to counter the extremely strong trade unions.

- They often lack funding for new equipment.

- They frequently occupy unsuitable premises, resulting in inefficient and expensive operating practices.

- They lack incentives to satisfy customer demands because the textbook office cannot place work elsewhere.

- Textbook print runs may be deferred or delayed to meet more urgent state needs, such as printing ballots.

It is clearly advantageous for a textbook office to be able to place its work wherever it can find the quality, reliability, and prices that it seeks. It is also important to be able to penalize a supplier for failing to meet criteria by placing an order elsewhere. Thus, to increase efficiency and quality, textbook offices that are obliged to use state-owned presses should be given greater authority over them.

Textbook offices use several approaches in working with private printers. Some states ask printers to bid for jobs and normally accept the lowest bids. Other states establish printing price scales in collaboration with local suppliers and allow any printer with the appropriate equipment that agrees to work according to the established scales a share of the total production requirement. In Uttar Pradesh this entitlement is extended to publishers as well as to printers, and in 1992–93 more than 900 publishers and printers were involved in printing textbooks. Other states set criteria that suppliers must meet to be included on the approved list. But inclusion on the list is no guarantee that a printer will receive work. Of 91 registered printers in Madhya Pradesh, only 39 were given work in 1993–94.

Private sector printers also have weaknesses. The most important consideration in placing work is almost always price, often because state procurement rules stipulate that the lowest price should always be accepted. Occasionally a printer can compete on price and provide better-than-average quality by investing in new, high-speed machinery. But more often than not printers that bid the lowest price deliver the lowest-quality textbook. These printers tend to:

- Have obsolete machinery that gives inconsistent results
- Pay low wages and employ poorly qualified staff
- Use poor-quality inks and binding materials
- Run machines faster than they should, which sacrifices accuracy
- Take too little time in preparing their machines for printing.

Constraints on competition come not only from obligations to use government-owned printing presses but also from pressure from private printers. When Karnataka "privatized" some of its textbooks for the 1992–93 school year, it guaranteed that 75 percent of them would be printed in the state. That share was too low to satisfy the local printers, and for 1993–94 the state had to agree to have all books printed in the state. Few states are able to place work outside their borders. For a state with a large and flourishing printing industry, such as Maharashtra and Tamil Nadu, this is not necessarily disadvantageous. But in states with limited and poorly equipped printing presses, the "print within the state" rule restricts competition and can result in lower quality.

Introducing Quality Control in Printing

Few textbook offices have more than rudimentary resources for quality control. They require printers to submit sample copies before releasing books for distribution, but printers will always make sure that only the very best samples are submitted. District education officers are sometimes asked to check the quality of textbooks supplied to their districts, but they lack even the most rudimentary technical expertise to do so. The more printers a textbook office uses, the more difficult production and quality control become. In Uttar Pradesh, with 900 publishing and printing suppliers, many are able to deliver substandard quality without being detected or penalized. Using virtually any printer that asks for work may be seen as equitable, but the results are far from satisfactory.

Having Printers Purchase Paper

Until the late 1980s the central government provided states with subsidized paper for textbook production. The textbook offices purchased the paper, warehoused it, and then released it to its suppliers in the public and private sectors. This approach was supposed to enable the textbook office to maintain control over a valuable commodity and to ensure that its suppliers printed no more than the number of copies allocated to them. But unscrupulous printers used the subsidized paper to print commercial jobs, using inferior paper to print textbooks. Experiments with watermarking and coloring the paper did not completely eliminate this practice.

Although the central government no longer provides paper, most states continue to buy it for their printers. It would be more efficient to have the textbook office specify the paper that its printers should use and allow them to purchase it, even if they levy paper-handling charges. This arrangement would lessen the administrative burden of the textbook office staff. Enabling a textbook office to negotiate highly competitive prices for paper on behalf of its printers could also yield major financial savings.

Some states already manage paper efficiently. Rather than buy paper, Karnataka and Uttar Pradesh set paper specifications with their suppliers and spot-check finished copies of textbooks throughout the state to ensure that the supplies meet the specifications. Uttar Pradesh even insists on reviewing receipts from the paper mill confirming the quality and quantity of paper that printers have purchased.

Making Sure Textbooks Reach Schools

Even the best textbooks will make no difference for students if they do not reach the classroom. Distribution is key. It is also an area where there are still problems:

- Reports from some states suggest that textbooks for free distribution are frequently late, so that children entitled to them end up having to buy their books.

- Reports also suggest that free textbooks find their way into the commercial market.

- In many states spurious textbooks often appear on the market before authorized versions.

- Textbooks for minority language groups are frequently late, often because translation and manufacture are tardy but also because wholesalers and retailers, fearing that they will be left with unsalable copies, prefer not to handle them.

- Private wholesalers and retailers eagerly accept incentives to sell in areas farthest from central and regional *godowns* but then sell the books in the immediate vicinity of the depots.

- Although discounts to wholesalers and retailers are agreed centrally, wholesalers use their commercial muscle to force retailers to accept a smaller margin than agreed and to handle other, optional supplemental materials.

- Retailers will sometimes sell textbooks only if parents and children also buy high-priced keys or guides. This occurs even though the retailers have agreed with the state authorities that they will neither stock nor sell keys and guides.

No state has overcome all difficulties in textbook distribution and sale, whether these functions are handled entirely by the private sector (Karnataka and Uttar Pradesh) or are retained by the public sector (Kerala and Tamil Nadu). Developing and introducing an improved strategy for distribution and sale will not be easy. States are large, textbooks must be transported great distances, the players (wholesalers, retailers, transporters, *godown* staff, education officers, head teachers, and teachers) are numerous and scattered, and distribution and sales need to be managed at every level of the system—from the textbook office through the district, block, and cluster to each school.

Complicating a shift toward a more efficient strategy is that states have invested in substantial infrastructure to support distribution. Much of this infrastructure remains idle during most of the year. District-level *godowns* often are used intensely only just before school opens, and many have backlogs of obsolete or damaged textbooks. In states that have their own vehicle fleets for distributing textbooks, vehicles and drivers are underemployed for much of the year. States can contract transport to the private sector, but many are reluctant to do so. Lack of information on the true cost of public distribution hinders cost comparisons.

One possible intermediate solution is to use cooperatives for distribution and sale. In Tamil Nadu, for example, cooperatives handle almost all distribution outside Madras. Cooperatives sometimes receive more favorable terms than commercial wholesalers and retailers, and they are also given limited credit. Where an efficient system of cooperatives exists, cooperatives may well be able to provide both the cheapest and the most efficient distribution network. Cooperatives can also ensure that any profit made on the sale of textbooks benefits the schools where the books are sold.

Conclusions

Improving the quality of textbooks and the efficiency of textbook publishing is a key challenge in boosting student achievement. India has two important assets that it can apply toward meeting this challenge: a base of institutional capacity and the presence in one state or several of good practices in most areas of textbook development and publishing. India's states can make much progress simply by adapting to their own circumstances these best practices from other states. Examples include the good use of the private sector for printing and distribution in Karnataka and Uttar Pradesh, the better pay for textbook writers in Karnataka, the simpler and more readable texts in Assam, Maharashtra, and Tamil Nadu, and the suitable number of pages assigned and printed for early grades in Assam and Maharashtra.

As could be expected, new practices are also called for. Some are needed to take advantage of the potential for improved efficiency emerging with the adoption of standards for minimum levels of learning by all states, making cross-border sales more feasible. Others are needed to help the textbook publishing industry evolve toward international standards of practice. The three most promising areas are adopting strategies to improve quality, establishing autonomous textbook corporations, and reducing the cost of textbook provision through greater involvement of the private sector.

Each state will need to select the mix of reforms that suit local circumstances, building on present strengths and changing practices in key areas. On balance, the relatively substantial changes called for should be feasible for each state because many of the improvements are already in place—somewhere in India.

Improving Quality

Three relatively straightforward actions would do much, over time, to produce more readable and more effective textbooks:

- *Setting standards.* Research clearly indicates the value to readability, and thus student learning, of setting standards on vocabulary and on the type and length of sentences for all textbooks. These standards would be enhanced by studies of children's vocabulary in all the languages used in India's states. Textbook corporations could train authors to use these standards.

- *Field-testing.* Even with solid research on readability, textbook writing remains as much an art as a science. The best and lowest-cost way to test quality before printing millions of books is to conduct simple field tests of readability and comprehension with students and teachers, carried out with the help of the persons involved in developing the material. These studies could be contracted to state and local research institutions and NGOs.

- *Investing more in research, writing, and design.* A lighter book bag with fewer, slimmer, and more readable books would substantially improve learning. The savings from reducing the number of pages (and from other efficiencies) would be well invested in the research, writing, and design efforts needed to improve quality. Efforts should be made to identify and train new authors and illustrators. Writers should be paid more, books should be better designed and illustrated, and the entire effort should be informed by readability research and systematic field-testing. The costs of these activities will be substantially less than the savings potential in most states. And the improved books will mean improved learning (see box 7.2).

Improving the physical quality of textbooks would require:

- Using better-quality and heavier paper for text pages

- Using better-quality covering materials and varnishing or laminating them

- Improving the strength of bindings by sewing rather than using wire stitching and by attaching covers properly.

If improvements that doubled the manufacturing cost increased books' life span from one year to three, the cost of textbook provision could be reduced by up to a third. If changes that raised the manufacturing cost only 50 percent increased books' life span from one year to two, the costs savings could be up to a quarter. Textbooks would need to be reused, and book banks and second-hand book markets encouraged. Parents would also need to accept that children would not have a new textbook in every subject every year.

BOX 7.2 BETTER TEXTBOOKS MEAN BETTER LEARNING

Professionally designed textbooks significantly improved the learning achievement of grade 1 children in Andhra Pradesh. This was the finding of a study of about 3,000 grade 1 students in 104 schools, randomly assigned to receive either a new textbook and nine supplementary readers or the current textbook. The study, carried out as part of the Andhra Pradesh Primary Education Project, tested students at the beginning of the school year and again at the end. The new textbook was written by a team of Indian teachers trained by an international specialist.

Results showed dramatic gains for the "new textbook" group, which outscored the control group by more than four points, for an effect size of more than 1 standard deviation difference between the experimental and control groups. A multiple regression analysis that controlled for student gender, parental literacy, household economic status, and the implementation of the project's intended pedagogy confirmed the statistical significance of the effect.

SCORES FOR CONTROL GROUP AND FOR GROUP USING NEW TEXTBOOK, GRADE 1, ANDHRA PRADESH

Group	*Control group gain*	*Experimental group gain*	*Effect size*[a]
All students	5.20	9.54	0.96
Boys	4.96	9.69	1.04
Girls	5.46	9.33	0.86

a. Relative to pooled pretest standard deviation.

Source: Rao and others 1995.

Improving Production through Textbook Corporations

In many states the fragmentation of authority for textbook publishing raises costs and lowers effectiveness. Financially autonomous textbook corporations such as the one in Tamil Nadu offer three key advantages:

- *Instituting financial controls.* Many states, especially those with state-owned printing presses, do not know the true cost of textbook provision. Accurate information on costs is necessary to set break-even textbook prices or to provide free or subsidized textbooks. Textbook offices often must wait for state resources to pay paper mills and printers. In at least one state the textbook office has had to raise finance from banks at 20 percent interest to prevent textbook manufacturing and supply from coming to a halt. A financially autonomous textbook corporation handles its own funds and should have no reason to call on state funding except for free or subsidized textbook provision.

- *Improving quality control.* Textbook corporations could strengthen quality control in textbook production—from writing through design to printing—by establishing a single organizational point of responsibility and authority.

- *Using flexible staffing strategies.* A financially autonomous textbook corporation can employ personnel with skills in different areas of publishing and arrange for staff to receive technical training without fear that they will be transferred soon after training. But a textbook corporation may not be able to pay salaries that are competitive with the private sector. If not, it could train entrants on a regular basis and be prepared to lose them to the private sector, or it could subcontract publishing tasks to private enterprises.

Reducing the Cost of Textbook Provision

In India, as elsewhere, there has been a tendency to manage the costs of textbooks by reducing the quality of manufacturing. Six alternative strategies may prove more fruitful:

- *Increasing the financial accountability of textbook corporations.* Textbook corporations, or their equivalent, should have the financial information systems needed to account for all costs and to set prices in a way that allows them to become self-sustaining financial entities. Once so established, they should sell books at market prices to the state education department.

- *Reducing the number of pages.* Field-testing would be especially useful in efforts to reduce the number of pages and thus the cost of printing textbooks. There is much scope for reductions in many states, and the cost savings entailed would be more than adequate to improve quality.

- *Increasing competition in printing.* With financial autonomy, textbook corporations could stimulate competition in the printing market by requiring government-owned printing operations to compete with the private sector on the basis of cost, quality, and reliability. Competition should improve efficiency in both the private and the public sectors.

- *Letting printers purchase paper.* By emulating the practice in Karnataka and Uttar Pradesh of requiring printers to purchase paper, textbook corporations could reduce the costs of printing and sharply reduce administrative overhead.

TABLE 8.1 PARALLEL POLITICAL, ADMINISTRATIVE, AND TECHNICAL MANAGEMENT SYSTEMS IN PRIMARY EDUCATION, INDIA

Level	*Political*	*Administrative*	*Technical*
Central	Government of India/ Ministry of Human Resource Development	Department of Education	NCERT, NIEPA
State	State legislature/state ministry of education	Directorate/Secretariat of Education	SCERT, SIEMAT
District	*Zilla parishad*	District education office	DIETs
Block, *mandal*, *taluka*	*Panchayat samiti*	Block education office, school inspectorate	Block resource center, cluster resource center
Village	*Gram pradan*, village education committee	Headmaster	Teachers

Note: DIET, district institutes of education and training; NCERT, National Council of Educational Research and Training; NIEPA , National Institute of Educational Planning and Administration; SCERT, State Council for Educational Research and Training; and SIEMAT, state institutes of educational management, administration, and training.

sible for imparting a national and integrative character to education, defining national education standards, supporting research and advanced study, and supporting institutions that assist states in formulating and planning education policy. It is accountable to the Cabinet Ministry, which is headed by the prime minister. The union minister of human resource development is assisted by the deputy minister for education and culture.

The Department of Education, located within the ministry, is the principal body for education policy formulation and planning in India. It is divided into 10 units, each headed by a joint secretary or joint education adviser. These units are responsible for the DPEP and planning, elementary education, secondary education, postsecondary education, adult education and the National Literacy Mission, languages, scholarships, technical education, finance, and accounts (India, Ministry of Human Resource Development, 1995b).

The Ministry of Human Resource Development and the Department of Education collaborate with both national and state institutions in carrying out their functions in education. Among the national institutions important for primary education are the Planning Commission, the Central Advisory Board on Education, the National Council of Educational Research and Training, the National Institute of Educational Planning and Administration, and the National Council for Teachers' Education.

Management of the education system in India is difficult, particularly in rural areas, where education is provided by a multitude of small, dispersed, and disparate schools. Horizontal and vertical lines of communication between the agencies that provide education services are encumbered by the absence of reliable communications media. At the school and village level responsibility and authority often are accompanied by inadequate resources. And institutional capacity for carrying out even the simplest function is weak.

India has moved to address these issues in four ways. The 73rd and 74th amendments to the Constitution, adopted in 1992, established *panchayati raj* institutions in all states and in principle devolved responsibility for primary education to district-level *panchayats*. District-level planners, village education committee members, and school headmasters were trained to participate in district planning exercises for school improvement. The capacity of state and district education institutions to provide support at block and village (school) levels was strengthened. And a new management information system was established to provide more accurate and timely education data for use at all levels.

A Complex and Changing Management Structure

India's 1949 national Constitution designated education as a state responsibility.[1] But the 42nd amendment to the Constitution, effected in 1976, made education a concurrent responsibility, investing Parliament with the authority to legislate on education and thus to facilitate the evolution of national policies for education. The government of India has largely relied on a consensus process to promote education development.

In 1992 India moved boldly and deliberately to decentralize governance by amending its national Constitution—an important action both symbolically and substantively. The 73rd constitutional amendment authorized states to establish a three-tiered (village, block, and district) governance structure of locally elected bodies—the *panchayati raj* institutions—and to transfer to these bodies from state government agencies the authority to develop and implement policies promoting economic development and social welfare. Elementary education was one of the most important areas to come under the *panchayati raj* institutions. Nevertheless, education remains the concurrent responsibility of both national and state institutions (see table 8.1).

Concurrent Responsibility for Education in India

The Ministry of Human Resource Development is responsible for formulating and planning national policy in human resource development. It also is respon-

- *Encouraging cross-border sales.* With the introduction of minimum levels of learning, state textbooks will come to cover similar content (although there will always be state-specific material in textbooks). States that are developing and printing minority language textbooks also being developed and printed in neighboring states could achieve savings by purchasing books from other states or by participating in joint efforts to develop textbooks.

- *Expanding the private sector's role in distribution.* Although publicly managed distribution through warehouses and depots is the norm in much of India, distribution through private booksellers has worked well in Karnataka and Uttar Pradesh, and cooperatives appear to be effective in Kerala. There are risks associated with selling textbooks through retail booksellers, but the inefficiencies and high costs in public distribution systems appear to outweigh them. States should give serious consideration to moving in this direction, perhaps by beginning on an experimental basis in selected districts.

CHAPTER EIGHT

Building Managerial and Institutional Capacity

The management of education in India is likely to change dramatically as *panchayati raj* institutions at the district, subdistrict, and village levels begin to function within a new framework provided under 1992 constitutional amendments. The devolution of responsibility to these institutions under the new framework could have spillover effects at all levels, leading to broadly based community support for education, school-level responsibility for effective instruction, and a cascading system of professional support. It could also lead to increased uncertainty as states sort out what responsibilities should be transferred to these institutions. And it will create new needs in training and technical support. At the same time, India faces the ongoing need to improve organizational structures, develop institutional capacity, and strengthen information systems within education.

Previous chapters have highlighted the importance for improving student achievement of increasing the level and effectiveness of inputs and improving the quality of teaching. The success of these efforts depends on the strength of managerial and institutional capacity throughout the education system. Effective schools require effective school management—and effective school management requires well-developed national, state, and district intermediary organizations that provide the leadership and resources schools need to translate policies into action at the level where teaching and learning take place.

The Planning Commission and the state planning departments are responsible for drafting India's annual and five-year plans. The department coordinates with the Planning Commission in developing the education sections of the plans.

The Central Advisory Board on Education is chaired by the union minister of human resource development and includes state and union territory ministers of education and leading national education experts. The CABE was responsible for formulating the 1986 national policy on education and its 1992 update.

The National Council of Educational Research and Training assists and advises the Ministry of Human Resource Development and state governments in formulating and implementing policies, programs, and innovations for education. The NCERT has branches at the state level, called SCERTs.

The National Institute of Educational Planning and Administration (NIEPA) assists the Department of Education and state departments of education in strengthening and improving educational planning and administration. NIEPA has representative branches in some states, called state institutes of educational management, administration, and training (SIEMAT).

At the state level, state ministries of education or their equivalent are supported by state departments, directorates, or secretariats of education, which are accountable to the chief minister of the state. State departments of education typically share progress reports with the national Department of Education through forums and consultative meetings.

In most states, the district is the most important unit of administration and management of education, although this is changing under the new *panchayati raj* legislation. The district education officer, who is responsible administratively to the state department, implements and supervises elementary education. In addition, block education offices have served as inspectorates and supervisors. More recently, block resource centers and cluster resource centers have been established to provide pedagogical support.

Responsibilities for education in India are concurrent not only for national and state bodies but also for state and intermediate bodies. While the recent constitutional amendments and accompanying state legislation delegate responsibility for primary education to locally elected bodies at the district, subdistrict, and village levels, by tradition and under administrative orders state-level bodies have been assigned a variety of technical, personnel, and quality control responsibilities exercised at all levels. At the village level individuals rather than institutions are typically assigned responsibility. The complexity of the system and the potential overlap in authority make successful administration a major challenge.

Before the National Education Policy of 1986 the central government played a modest financial role in primary education (India, Ministry of Human Resource Development, 1992a, 1993d). States provided virtually all investment and recurrent cost financing. Most states accorded low priority to primary education. State planning and management mechanisms were poorly developed, and primary education systems were characterized by routine administration of inadequate finances by districts, which built and supervised schools. Efforts to improve primary education were limited to small-scale pilot programs in a few states.

Since 1986 the central government has sought to expand its leadership and financing role in basic education through centrally sponsored schemes and mobilization of external assistance. The first centrally sponsored schemes (Operation Blackboard, DIETs, and nonformal education) provided standard packages of inputs to schools, districts, and nonformal education centers, regardless of local conditions. Other than DIETs, until recently there has been little investment in developing local, district, state, or national institutional capacity for planning and managing education reform programs or for evaluation and research.

Greater Technical Support by National Institutions

Education management at all levels is strengthened when based on good information from tests of learning achievement, from monitoring, and from research. Testing, monitoring, and research programs have been critical to education reform over the past quarter century in industrial countries, providing the information needed to improve education policy and programs at national, district, and school levels. In developing countries good information systems that provide data on the costs and effectiveness of inputs are particularly important because such systems allow education policymakers to decide how to allocate scarce resources most efficiently (Middleton, Terry, and Bloch 1989; Lockheed and Hanushek 1988).

In India national institutions have held concurrent responsibility with states for education policy, finance, and technical support. These roles are not likely to change with the new constitutional reforms. Instead, national bodies may be called on to provide even more technical support, particularly for achievement testing, monitoring, and research, which are key activities in improving the flow of information.

At the primary level tests of learning achievement can provide indicators of student attainment of such central objectives as functional literacy and numeracy. They also enable managers to identify schools and groups of schools (clusters, districts, states) that are performing well and those that are not and to monitor trends. In schools and districts achievement data enable managers to identify areas of the curriculum where improvements are needed and to form responsive strategies. In India state or national assessments of learning achievement at the primary level are carried out periodically by the NCERT as research studies. No other systematic monitoring of student achievement is carried out before the end of grade 8, when students are tested on their mastery of the primary curriculum for admission into secondary-level education.

Monitoring comprises a set of techniques (indicators, surveys, routine reporting, observation) that generate the flow of information on which education policies and programs depend. Weak monitoring systems are a significant liability in the education systems of many developing countries (Verspoor 1989; Middleton, Terry, and Bloch 1989; Lockheed and Hanushek 1988). The resulting lack of information, particularly on costs and outcomes, hampers efforts to improve education. In India strengthened monitoring systems are being developed to capture basic statistical information on costs, teachers' qualifications and deployment, students' characteristics, and attendance, dropout, and repetition rates. Such systems are being implemented on a pilot basis in several districts but are not yet operational at the national level.

India has long had research institutions in education and the social sciences. Until quite recently this research capacity has not been used to address issues in primary education. Moreover, for research in primary education, Indian institutions were weak in some of the essential components of a strong research capacity: adequate funds, trained and motivated personnel, an indigenous literature, a base of general information, a technical support staff, organizational arrangements for conducting research and disseminating results, and institutionalized procedures for collecting, processing, analyzing, storing, and retrieving (quantitative and qualitative) data. Under the DPEP, capacity for primary education research is being strengthened, and research results are being disseminated. For example, the NCERT has just published the proceedings of the 1995 conference on School Effectiveness and Learning at the Primary Stage (Kumar 1996).

As testing and monitoring systems in India are strengthened, they will begin to provide states with a rich flow of data and information on schools. It is important that states establish the capacity to use these data effectively—to identify good practices and to spot problems. In India, as in all countries, routine assessments are needed in such areas as the effectiveness of learning materials, the effect of training on the performance of teachers and headmasters, the effects of school improvement strategies on educational outcomes and equity, the effectiveness of supervision, and the effectiveness of alternative instructional practices. Economic and social research will be needed to complement these assessments. Cost studies at different levels are also needed. Equally important are efforts to disseminate good practice among schools. Dissemination of successful local initiatives not only provides models for other schools but also reinforces and rewards local accomplishments.

Shifting Role for State Institutions

Historically, state-level bodies have had primary responsibility for a wide range of functions in education, ranging from policy and planning to direct provision of services to monitoring and evaluation. In a recent study Seetharamu (1995) analyzed which institutions, at which level, had the most responsibility over a set of 71 education functions, including hiring and firing teachers, building schools, developing curricula, and selecting textbooks. Looking at the situation in Karnataka before any changes resulting from the 1992 constitutional amendments, Seetharamu found that virtually all decisions of any consequence in education were made at the state level. In Karnataka nine state-level institutions were responsible for setting policies and standards, providing services, and monitoring and evaluating performance (see table 8.2).

But with the *panchayati raj* reforms will come big changes in the technical, administrative, and political responsibilities of all state institutions. As intermediate institutions take on increasing responsibility for service provision, the role of state institutions will shift toward setting standards and evaluating performance. Facing the biggest challenge will be the technical institutions—the SCERT, the SIEMAT, and the textbook board—whose role will change dramatically under the new education policy, from one of control to one of support, but without corresponding changes in staffing and operation.

Growing Responsibility for Village, Block, and District Institutions

Local bodies have played a role in primary education in India since the nineteenth century as a corollary of the Woods Dispatch of 1854, which directed the levy of local taxes to defray the cost of maintaining primary schools. Local authorities were accorded increasingly greater control over primary education until 1929, when the Harthog Committee recommended withdrawing local control. In Bombay the Act of 1938 withdrew from local bodies the power of inspection and made the education administrators civil servants. In Karnataka the state resumed control of schools from local bodies in 1941. State-centered control of education held sway until the 1960s, when *panchayati raj* institutions were again established. Some states used these bodies effectively, while others did not, and for thirty years there was considerable variation across states in the level of *panchayati raj* institutions' activity.

Reforms under the 73rd and 74th constitutional amendments will transfer significant resources and responsibilities to *panchayati raj* institutions. New intermediate-level *panchayati raj* institutions given responsibility for education include *panchayat samiti* (at the block, *mandal*, or *taluka* level) and *zilla*

TABLE 8.2 STATE-LEVEL RESPONSIBILITY FOR EDUCATION FUNCTIONS, KARNATAKA, 1994

Responsible body	*Functional responsibility*
Ministry of Education/ Secretariat of Education	Develops education plans, sets nonteaching personnel quotas, raises and allocates resources, monitors expenditures
General Curriculum Committee	Sets curriculum norms, develops curriculum
Directorate of State Educational Research and Training/ Directorate of Textbooks	Writes textbooks, develops and approves textbook manuscripts, supplies science kits and language kits, sets teacher certification standards
Director of Public Instruction (Primary)	Sets guidelines for homework policy and for purchase of instructional materials, supplies Operation Blackboard equipment, supervises supervisors
Karnataka Text Book Society	Prints and distributes textbooks
Karnataka Secondary Education Examination Board	Establishes student certification standards, designs and administers tests, disseminates test results
Commissioner of Public Instruction	Dismisses and promotes supervisors, assigns supervisors to regions, authorizes transfers of education officers, collects information for educational plans, monitors, sets guidelines for parent and community participation
Karnataka Public Service Commission	Hires supervisors and nonteaching personnel
Government of Karnataka Pay Commission	Sets salaries for teachers, principals, and supervisors

Source: Seetharamu 1995.

parishad standing committees on education (at the district level). Recommended responsibilities are broad and include personnel (appointing and transferring teachers), finance (allocating funds to schools, preparing budgets and approving expenditures, and generating resources through fees and donations), and academic supervision. Table 8.3 summarizes responsibilities for primary education at the village, block, and district level for various large states in India as

TABLE 8.3 RESPONSIBILITY OF PANCHAYATI RAJ INSTITUTIONS FOR PRIMARY EDUCATION, VARIOUS THREE-TIER INDIAN STATES, 1995

State	*Zilla parishad (district)*	*Samiti panchayat (taluka or block)*	*Gran panchayat (village)*
Andhra Pradesh		Manage elementary and higher elementary schools	
Gujarat	Primary education; recruit primary schoolteachers; construct school buildings	Establish primary schools; primary education	Primary schools
Karnataka	Establish and maintain ashram schools; promote primary education	Promote primary education; construct, repair, and maintain schools	Promote public awareness and participation in primary schools; ensure enrollment and attendance in primary schools
Madhya Pradesh		Establish primary school buildings	Inspect schools; construct and maintain primary schools; distribute free textbooks and uniforms; manage scholarships for scheduled caste/scheduled tribe primary schoolchildren; organize nonformal education

Maharashtra	Establish, maintain, inspect, and repair primary schools; provide teaching aids to primary schools	Primary education	Promote education
Rajasthan	Ensure proper functioning of primary schools	Promote primary education	Supervise primary schools; transfer, post, and disburse salary of primary schoolteachers
Uttar Pradesh	Construct and maintain primary schools	Establish and maintain primary schools	Establish primary schools
West Bengal	Construct primary schools in flood-affected areas; supervise primary schools	Promote primary education	Construct primary schools in flood-affected areas; distribute textbooks

Source: Jain 1993; NIRD 1995.

of 1995. These responsibilities are largely equivalent to those already being carried out by the regular administrative cadre for education at the district and block level, as in Karnataka, for example (see table 8.4).

The *panchayati raj* reforms have created new needs for coordination among institutions involved in education. The elected and appointed *panchayati raj* institutions will need to coordinate with administrative arms of state bureaucracies at the district, block, or *taluka* level, such as district institutes for education and training and block and cluster resource centers. These institutions provide technical support for teaching and learning and will operate in parallel with the *panchayati raj* institutions at equivalent levels, which will have budgetary control and will focus on policy. All these institutions are being strengthened by centrally sponsored schemes and projects supported by external donors. For example, the Andhra Pradesh Primary Education Project, supported by the Overseas Development Administration, strengthened the research and evaluation capacity of DIETs. And the Uttar Pradesh Basic Education Project and the District Primary Education Program have built and strengthened DIETs, and block and cluster resource centers.

Intermediate institutions will need to coordinate their efforts with regard to at least three types of responsibilities: formulation of policies and priorities and decisions about resource allocation through the *panchayati raj* institutions; provision of technical support and assistance to schools through block and cluster resource centers and DIETs; and provision of resources and administrative guidance through the *panchayati raj* institutions and the district education offices. These are new and changed roles for all these institutions.

The amount of change required is suggested by a study that analyzed the diaries of 10 district education officers in Andhra Pradesh. Venkamma (1990) found that district education officers spent 33 percent of their time on administration, 22 percent on managing examinations, 20 percent on managing academic activities, 11 percent on planning, 10 percent on redressing grievances, and 6 percent on budgeting and financing.[2] They spent virtually no time on providing instructional support. And in some cases, the changing roles will need to counteract existing trends. Varghese (1994a) found that district education officers have spent increasingly little time on activities directly related to school improvement. Between 1972–73 and 1990–91 the share of their time that these officers devoted to visits and inspections fell, on average, from 26 to 10 percent in Punjab, 33 to 15 percent in Haryana, and 43 to 35 percent in Kerala.

At the village level, the CABE Committee on Decentralized Management of Education proposed establishing village education committees and *panchayat* standing committees on education as authorized under the *panchayati raj* reforms. These local bodies would provide supervision (checking student and

TABLE 8.4 DISTRICT, BLOCK, AND VILLAGE RESPONSIBILITY FOR EDUCATION FUNCTIONS, KARNATAKA, 1994

Responsible body	*Functional responsibility*
District director of public instruction	Promote, discipline, dismiss, and authorize transfers for teachers; appoint, promote, discipline, and dismiss principals; select principals for in-service training; transfer secondary school principals; allocate inspectors of schools; sanction leave for and supervise work of education officers, inspectors of schools, and assistant education officers; supervise, dismiss, sanction leave for, and authorize transfers for nonteaching personnel; involve parents; monitor parent participation; establish certification standards for higher primary school examinations; design and administer tests and disseminate results; raise resources
District textbook depot, retail outlet of public distribution system	Distribute textbooks
District subject inspectors	Guide the teacher in local adaptation of curriculum; supervise high schools; supervise principals of secondary schools
District-level recruitment committee	Recruit teachers for specific schools
Chief executive officer of *zilla parishad*	Construct schools; monitor civil works expenditure
Block education officers	Select teachers for in-service training; sanction leave; transfer primary school headmasters; sanction leave for and supervise work of inspectors of schools; supervise, dismiss, sanction leave for, and authorize transfers for nonteaching personnel; involve parents; monitor parent participation; administer tests; raise resources
Block inspector of schools	Supervise schools
President of *mandal panchayat*	Construct schools; monitor civil works expenditures
Gram pradan	Repair school building

Source: Seetharamu 1995.

teacher attendance) and advice (recommendations on the school budget) and carry out minor tasks (construction and repair work, setting the school calendar). The new village education committees are to include the chairman of the *panchayat*, the head teacher or headmaster, persons interested in education, and representatives of parents, scheduled castes, scheduled tribes, other backward castes, minorities, and *anganwadi* workers; a third of the members are to be women. In most states in India communities have traditionally had little direct responsibility for primary education. As a result, most committee members have little experience in the management of schools. Many may also be nonliterate. Thus, initially the members of the new village education committees may lack the knowledge and skills to carry out the functions assigned to them.

Local elections for *panchayati raj* bodies have been held in all states, but it is too early to see benefits from the 1992 constitutional amendments, particularly for the quality of education. But experience with *panchayati raj* institutions in education suggests that the effects may vary from state to state. In some states local bodies could be especially effective in mobilizing resources for constructing schools and in monitoring teachers' attendance (Premi 1995). In some states *panchayati raj* institutions are hiring *shiksha karmi* (school-based education workers). But the effectiveness of *panchayati raj* institutions may be limited by inadequate financial support for education from the state. The share of state revenue transferred to intermediate levels has declined in recent years. Between 1968–69 and 1987–88, for example, the share transferred to *panchayati raj* institutions dropped from 14 to a little more than 1 percent (Nadkarni 1990).

The effectiveness of *panchayati raj* reforms in improving the quality of education could also be limited by the influence of various stakeholders. Experience in some states suggests that elected members of local bodies, especially at the village level, may be "captured" by special interests. In Kerala, for example, there are reports that village *panchayats* serve largely as functionaries of political parties and pursue party objectives. In Andhra Pradesh and Karnataka *panchayati raj* institutions have come to be viewed as agents of government bureaus rather than as independent bodies.

Head Teachers Gaining More Responsibility for Instructional Leadership

In much of rural India very small schools are the norm, and as many as 70 percent of primary schools operate without formal "principals." Instead, the most senior teacher acts as the teacher in charge. But many very small schools, with only one or two teachers, do not have even a teacher in charge.

Headmasters, head teachers, teachers in charge, or principals (here, "headmasters") at the primary level have the primary responsibility for only a few activities, according to data from the DPEP baseline assessment studies in eight states.[3] They typically exercise little authority in decisions about generating or allocating resources. Their main responsibilities involve routine decisions relating to students and school maintenance. For example, in Karnataka, Seetharamu (1995) found that school headmasters have the primary responsibility for deciding on standards for student selection, promoting students, evaluating students, ensuring student enrollment and attendance, disciplining students, sanctioning teachers' leave, collecting information for education plans, supervising nonteaching personnel, administering tests, raising resources, performing liaison with the block education office, and involving parents in school betterment committees and parent-teacher associations. Most remarkable is what schools are not responsible for: instruction and instructional leadership, teaching, and learning.

Headmasters do not participate in decisions that affect their ability to improve student achievement. Curricula are designed at the state level, often with little attention to the diversity of schools and to students' ability and interests. Of particular concern is how little responsibility school headmasters have for recruiting and evaluating teachers (see table 8.5). Teachers are appointed, assigned, and promoted at the district level, leaving headmasters little control over the selection or discipline of their teachers. Teacher deployment practices do not take into account regional needs (including instructional language) and

TABLE 8.5 HEADMASTER'S RESPONSIBILITY FOR SELECTED EDUCATION FUNCTIONS IN LOW-LITERACY DISTRICTS, EIGHT INDIAN STATES, 1993

(average; percent)

Function	*Head teachers reporting having primary responsibility*
Drawing up timetable	95
Establishing homework policies	95
Establishing standards for student promotion	92
Assigning teachers to classes	89
Evaluating teachers' performance	79
Determining expenditures on instructional aids	63
Adapting syllabus to local conditions	61
Raising extra funds for the school	46
Making expenditures without prior approval	30
Appointing teachers	5
Dismissing or transferring teachers	3

Source: World Bank staff calculations based on data from NCERT, NIEPA, and New Concept 1995.

often do not consider subject matter or grade-level needs, undermining headmasters' ability to build and maintain an effective school environment. Nor do headmasters have the authority or resources to organize staff development programs addressing the problems and challenges facing teachers in their schools.

Of course, some schools have exceptional headmasters who take an instructional leadership role. Such schools look and feel different from those that lack effective leaders. And research in low-literacy districts in eight states suggests that the headmaster's role as an instructional leader can affect learning achievement (Saxena, Singh, and Gupta 1995). Research on private schools (unaided or government aided) shows that one explanation for their greater effectiveness—and their greater cost-effectiveness—compared with government schools is the management practices of the principal (see box 8.1).

Despite limited responsibility, the headmaster's tasks are multifaceted and complex. They include supervising teachers, fostering community and parent relations, maintaining facilities and equipment, meeting a range of reporting

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BOX 8.1 COST-EFFECTIVENESS OF PRIVATELY MANAGED AND GOVERNMENT SCHOOLS IN TWO INDIAN STATES

Could public schools improve their effectiveness or efficiency by adopting the management practices of private schools? Two studies comparing the effectiveness and cost-effectiveness of government, private aided, and private unaided schools say "yes." These three types of schools differ in their autonomy over budgets and management. Private unaided schools have both budgetary and managerial autonomy (although this may be mediated by a school board) and can choose a mix of inputs appropriate to local conditions. Private aided schools have full managerial but limited budgetary autonomy, whereas government schools have virtually no budgetary or managerial autonomy.

Private Unaided Schools in Uttar Pradesh

A study of urban schools in Uttar Pradesh found that private unaided junior schools were significantly more cost-effective than either government or private aided junior schools. Surveying grade 8 students in 30 secondary schools in Lucknow in 1991, and controlling for student background characteristics and selection effects, Kingdon (1994) found that students in private unaided junior schools performed significantly better on tests of reading and mathematics than students in government and private aided schools. There were no differences between government and private aided schools. Moreover, for every Rs100 spent, the achievement of students in private unaided schools was boosted by 0.61 standard deviation, compared with and recordkeeping requirements, and, in small schools, teaching. Primary school headmasters have also been assigned new responsibilities for liaison with *panchayati raj* bodies, particularly the village education committees. The headmaster must perform these tasks in the face of significant constraints—chronic shortages of materials, clerical support, operating funds, and resources for staff development—and rank and salary ceilings that detract from the attractiveness of the position.

In India, as in almost all developing countries, headmasters are selected from the ranks of teachers on the basis of seniority and then promoted. There is virtually no systematic training, and headmasters are unlikely to get any training before their appointment unless they happen to serve as a deputy or assistant headmaster. Yet headmasters' teaching experience and the number of training courses they attend have been found to be related to higher student achievement in studies in Egypt, Indonesia, and Paraguay (Heyneman and Loxley 1983; Sembiring and Livingstone 1981; Fuller 1987).

0.13 standard deviation for students in government or private aided schools.

Private Aided Schools in Tamil Nadu

By contrast, a study of 2,735 grade 4 students in 113 schools in Tamil Nadu found that private aided schools were more cost-effective, and private unaided schools were less cost-effective, than government schools. Controlling for student background characteristics and using multilevel modeling techniques, Bashir (1994) found that students in both private unaided and private aided primary schools performed significantly better on tests of reading and mathematics than students from government schools.

But for every Rs100 in institutional recurrent costs and private costs (for textbooks, supplies, uniforms, and miscellaneous fees), achievement by students in urban private aided schools increased 0.57 standard deviation (reading scores plus math scores) compared with 0.35 standard deviation for students in government schools and 0.29 standard deviation for students in private unaided schools. In rural areas each Rs100 yielded 0.40 standard deviation of improvement in achievement in private aided schools compared with 0.38 for students in government schools and 0.35 for students in private unaided schools.

Variables associated with more effective leadership by head teachers were positively associated with higher levels of achievement. Thus, adopting the better management practices of head teachers in aided schools—closer supervision of teachers and greater commitment to high student performance—might help head teachers in government schools to boost their students' learning achievement.

Meeting the New Challenges

Institutions at all levels will see their functions change as the 73rd and 74th constitutional amendments are implemented. As responsibility for education becomes decentralized, district-level personnel, school headmasters, and village education committees will acquire many new responsibilities or receive formal authority to carry out the complex tasks that they already perform. These shifts in responsibility need to be accompanied by careful planning to prevent the administrative weaknesses that arise when managers lack sufficient authority or resources to do their jobs effectively, when lines of communication are blocked, when roles and responsibilities are unclear, or when managers' time is consumed by routine tasks.

Sustaining National Institutions

At the national level a professional base needs to be established to support the strengthening of state institutions. This would require three actions:

- Establishing a center to document national and international education resources

- Developing national resource teams in key areas with staff drawn from a wide range of institutions

- Building a network of resource institutions, including the national and regional apex institutions, university education departments, institutions outside education (for example, Indian institutions of management), and NGOs.

Implementing these changes will require exposure to new ideas, dissemination and exchange of successful practices, ongoing staff development, and recruitment policies designed to select experienced and innovative education professionals for these institutions.

Strengthening State Institutions

The challenge of improving schools in India's enormous and diffuse education system will need to be met by strong institutions at the block, district, and state levels that can provide the necessary support. Strengthening these institutions, particularly in poor rural districts, has been a primary objective of national and, in some cases, state policy.

At the state level the biggest challenges are those confronting the technical institutions. The roles of the state councils of education, research, and training, state institutions of education, management, and administration, and textbook boards are changing dramatically under the new education policy, but their staffing and operation will remain largely unchanged. Their staff will need to:

- Adopt new models of professional practice (interactive training, action research, systematic processing of feedback, and learning from experience)
- Adjust to the change in their role from control to support
- Shift the focus of their work program from secondary to primary education.

Training District-Level Education Personnel

At the intermediate level the *panchayati raj* institutions, cluster and block resource centers, DIETs, and district education officers will all assume new and changed roles. The staff in these technical, administrative, and political institutions will need considerable guidance and training.

District-level administrative personnel may have the greatest need for training. Varghese (1994a), using data largely from time-use studies of district education officers in three states, notes that training may be required in several areas: microplanning and prioritization of local needs, costing alternatives, coordination with other departments, participatory planning, dealing with elected bodies, accounting practices, computer applications, planning for teacher training, using research for decisionmaking, monitoring indicators, and negotiating.

Establishing Effective, Well-Managed Schools

At the school level several actions are essential to establish effective, well-managed schools:

- Increasing the head teacher's autonomy and accountability
- Increasing the head teacher's responsibility as a school leader and a pedagogical resource
- Implementing more effective instructional strategies, including regular monitoring of student learning

- Involving village education committees in monitoring enrollment and student and teacher attendance, in mobilizing the community, and in raising resources

- Providing extensive, sustained training to equip school personnel and village education committee members to handle their new responsibilities.

Varghese (1994a) suggests that headmasters will need training in general administration (especially accounting and record maintenance), institutional planning, monitoring school activities, dealing with *panchayat* members, linking schools with the community, and planning for equipment.

For village education committees, the challenge is to identify the tasks that they could carry out effectively and to plan training accordingly. Training village education committees to monitor teachers' attendance could be one important way of improving the effectiveness of village schools. A review of the experience with *panchayati raj* institutions indicates that these committees can be effective in the local monitoring of teachers' attendance, which, as reported in chapter 4, is strongly and positively associated with students' learning achievement. Village education committees could also monitor children's enrollment and attendance, provide support for school maintenance, organize extracurricular activities, and take on responsibility for mobilizing resources.

CHAPTER NINE

Financing Elementary Education

Several factors constrain the capacity of India's education system to meet the needs of a liberalized and fast-growing economy by rapidly expanding and improving coverage, quality, and efficiency, particularly in elementary education. An important one is the availability and optimal use of financial resources. How can India best respond to emerging issues in the financing of education?

The central government, which has some constitutional role in the direct provision of education, has expanded its activities in recent years through centrally sponsored schemes, and further expansion of its role may be appropriate. But the onus for financing an elementary education of reasonable quality for all of India's children rests mainly with the state governments. Trends in state public finances suggest that in several states the necessary finance will not be available unless the governments enhance revenue yields and alter the structure of their expenditures.

Recommendations for financing elementary education in India need to take account of three factors. First, education financing occurs in the context of a federal political system. Second, since 1991 the government of India has put into place a series of economic reforms with implications for several aspects of central and state public finances. And third, the coverage, and perhaps the quality, of education varies widely across states, reflecting differences in both past and current resources and in the priority given to the sector. Against this background, two financing issues emerge: what expanding the coverage and quality of elementary education would mean for state public finances, and what role the central government might play. These issues are addressed in this and the final chapter.

Constitutional Responsibilities for Education Finance

Following independence, India's 1949 Constitution divided power between the central and state governments. In education it gave the central government direct responsibility only for the central universities and similar institutions and for standards in higher education (including professional, vocational, and technical education) and a shared (concurrent) responsibility with the states for vocational and technical training. The Constitution assigned all other responsibilities to the states. In practice, however, emphasis on comprehensive economic planning and five-year plans for both central and state government activities inevitably led to a larger role for the central government than the assignment of central, state, and concurrent functions suggested. The constitutional amendment of 1976, which made much of the remaining responsibility for education concurrent, legalized a situation that already existed in practice.

Despite the amendment's assignment of much concurrent responsibility, the 25 state governments and the administrations of the 7 union territories provide almost 90 percent of all education finance, invariably their largest expenditure item. On average, however, more than 40 percent of state government expenditures are based on resources transferred by the central government through a mix of nondiscretionary and discretionary funding. Clearly, then, any attempt to analyze education financing in India, and to consider needs and constraints, first requires an examination of fiscal federalism.

Fiscal Federalism around the World

There are two potential kinds of imbalance between resources and responsibilities in a federation—vertical imbalance (between the central government and all state governments combined) and horizontal imbalance (among state governments). A vertical imbalance implies that a level of government cannot command sufficient resources to carry out its constitutional obligations at an acceptable level and that welfare would be improved by fiscal adjustment or the reallocation of obligations. In many countries state government expenditures have exceeded levels that could be financed by existing arrangements for state taxation and statutory transfers. Countries have responded in different ways—continually adjusting the redistributive mechanisms, increasing nonstatutory grants, shifting administrative responsibilities to higher levels of government, or using some combination of these strategies. The variety of responses across countries, such as Australia, Brazil, Canada, Indonesia, Nigeria, and the United States, and the continual fine-tuning of arrangements suggest that the solutions are not simple and that those in place are not particularly stable.

For vertical imbalances in education financing, the central issue is the level of education at which additional direct or indirect federal funding should be provided, and through which fiscal mechanism. None of the industrial countries with a well-established federal system of government assigns constitutional responsibility for education to the federal government. Direct federal expenditures are limited largely to grants for specific types of students (ethnic minorities, the handicapped, armed forces children) and for research and tend to amount to 8–9 percent of total education expenditure. In Brazil and Nigeria, however, the federal governments have overriding constitutional responsibility for publicly provided higher education. In Brazil the federal government is also involved in secondary technical education. In these countries the federal government accounts for 30 percent of education expenditure.

Countries with a federal system of government tend to be large, with wide disparity in wealth among states. This disparity is often particularly wide in the federal developing countries. Differences in states' economic bases lead to differences in their ability to raise tax revenues. If federal transfers do not offset these differences, the services provided to citizens in different states will vary enormously.

The second fiscal issue in a federal system, then, is how transferred revenues should be divided among the state governments to reduce the horizontal imbalance. There are two general approaches. The first uses specific-purpose grants to ensure that services will be equal among states or at least above a certain minimum in each. The second works indirectly, using general-purpose grants or adjusting revenue-sharing to ensure that each state has sufficient revenues to make it possible to provide a standard service. Most federal governments have used a mix of these approaches in an attempt to strike a balance between the objectives of equity and decentralization.

Some countries use federal transfers to offset horizontal imbalances in education financing among states. Australia bases the amount of grants for such purposes on the recommendations of independent commissions, and Canada on formulas, while Germany determines grants through a broad system of responsibility-sharing. In federal developing countries specific-purpose grants to equalize performance in education have undergone periods of both popularity and unpopularity. Nigeria used them for primary education in the late 1970s and again in 1990–92. Brazil has also used them.

The Indian Approach to Fiscal Federalism

India's Constitution recognizes that the states are unable adequately to perform the functions assigned to them without additional funds. State governments fund about 60 percent of their expenditure from their own tax and nontax sources. They collect about 35 percent of all taxes and are responsible for about 55 percent of all government expenditure (Chelliah, Rao, and Sen 1992). Federal transfers account for about 40 percent of state government revenues, covering half of plan expenditures and a quarter of nonplan spending.

The principle of revenue-sharing underpins the nondiscretionary system of federal financing, for which the main sources are specified shares of particular taxes (mainly income and excise) and grants-in-aid. Revenue shares are determined by a finance commission every five years. A second source of center-state transfers is the Planning Commission, which allocates nonstatutory transfers that are largely formula-based, partially conditional, and a mix of grants and loans.

Between 1969 and 1980 statutory transfers through the Finance Commission accounted for 66 percent of aggregate budgetary transfers, but between 1980 and 1990 they fell to 61 percent and in 1992–93 to less than 59 percent. An increasing share of discretionary transfers has come not from the Finance or Planning Commission directly but through central ministries under centrally sponsored schemes (including for education), often with conditions. In the Fifth Plan period 39 percent of plan allocations came through such schemes, which increased to 52 percent in the Seventh Plan period (1985–90). Increased direction has gone hand in hand with increased resources.

The distribution of transfers among states is an important political economy issue in India. The Finance Commission has based its awards for nonplan or maintenance expenditure on states' population, per capita income, and tax revenues, although the exact criteria have changed from one commission to the next. For the past 25 years the Planning Commission has based direct transfers on the so-called Gadgil formula and its amendments. Initially, it allocated 60 percent of awards on the basis of population and 10 percent each for below-average per capita income, above-average per capita tax effort, and major irrigation and power projects; 10 percent was discretionary. Since then, this formula has undergone a series of small modifications. Although per capita transfers from the Finance Commission have been higher for lower-income states, the equity effect has been somewhat neutralized by the Planning Commission's distribution of transfers, which has favored states with higher per capita income (World Bank 1995a, table 2.6).

State governments dominate education finances, with the central government providing only about 11 percent of all government financing for education. The central government's direct involvement in education is limited to a small set of institutions such as regional colleges of education and centers for advanced university studies and to activities such as promoting Sanskrit and Hindi in non-Hindi-speaking states and educating the handicapped. In addition, the government allocates funds to the University Grants Commission for central universities and some plan activities in state universities and colleges. The main mechanism for directly reducing vertical imbalance is transfers to state governments for centrally sponsored schemes through the central Department of Education. It is expected that local governments will take over the management, though not necessarily the financing, of primary and secondary schools. The details of this transfer of responsibility have not yet been laid out. Nor have the financial arrangements, although it is expected that state finance commissions analogous to the national Finance Commission will eventually be established to determine transfers from state to local governments.

Although educational development is uneven across India's states, Tilak (1989a) argued that through to the mid-1980s neither the Planning Commission nor the Finance Commission attempted to reduce this horizontal imbalance by introducing progressivity in transfers to states for education. This pattern has continued until recently. For example, in the centrally sponsored scheme Operation Blackboard, which has distributed more than Rs10 billion to states since 1987, educationally less-developed states received less per capita than other states. The per capita allocation across all states between 1989–90 and 1994–95 was Rs11.8, but for the five most educationally backward states it was Rs10.9. At least part of the problem lies in difficulties of absorption and the requirement for some matching state resources, however. As described in chapter 1, the District Primary Education Program is now beginning to address this issue by making grants available for the most educationally backward districts.

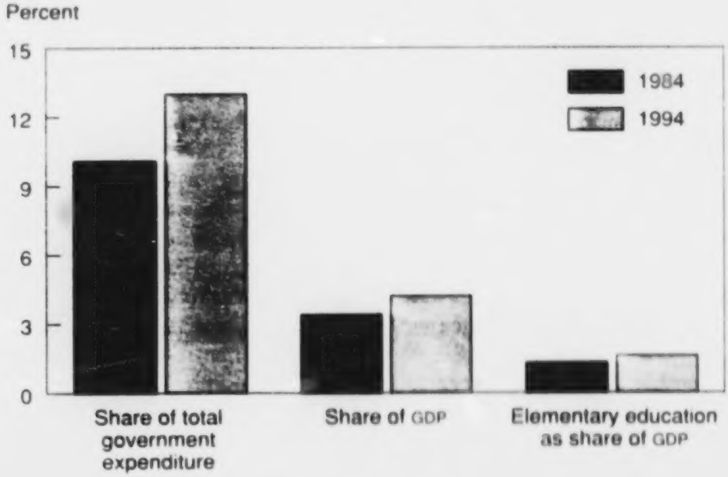
Current Education Expenditure Summarized

The sources, level, and distribution of financial resources for education are the result of a complex set of factors. State governments, households, and the central government are the main providers of financing, in that order. The ability of state governments to fund the sector depends on their willingness and ability to raise revenues, the centrally raised revenues transferred to them through the finance and planning commissions, and the priority given to competing demands for expenditure. Household spending on education reflects the levels and distribution of income, the perceived adequacy of publicly provided services, household expenditures required by the public system, and, again, the priority given to competing demands. The central government provides small direct expenditures, reflecting the constitutional division of responsibility. It also allocates tied grants to states at each level of education for activities that it presumably believes receive insufficient funding. Constitutionally, such transfers have no limit: their level reflects the widespread view that the state has overriding responsibility for education. These factors determining the level and distribution of financial resources for the education system have six important outcomes.

First, total government expenditure on education is relatively low. Expenditures by the central and state departments of education in 1994–95 amounted to 3.5 percent of GDP, a higher share than in the previous two years, but less than the peak of 3.8 percent in 1989–90 (see figure 9.1). With education expenditures by other departments (the largest amounts come from the agriculture and labor departments), the share in 1994–95 was 4.2 percent. Although the share of total recurrent budgetary resources devoted to education in India has been increasing in recent years, from 11.8 percent in 1986–87 to 13.4 percent in

Elementary education receives only a small share of national income.

FIGURE 9.1 EDUCATION AS A PERCENTAGE OF GOVERNMENT EXPENDITURE AND GDP, INDIA, 1984 AND 1994



Source: India, Ministry of Human Resource Development, 1995a, 1995c.

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1994–95, it is still below the average of 17.5 percent for all low-income countries excluding India and China (UNDP 1993). This relatively low share partly reflects the extensive government involvement in the economy, which includes providing significant direct budgetary subsidies.

Second, although central government expenditures on education are relatively small, they are of strategic importance. The central government allocates 2.5 percent of its total expenditure to education, funding about 11 percent of all education expenditure. But this share includes almost two-fifths of the total plan allocations for education, which are used to fund new programs and expand existing ones, giving the central government greater influence over the future evolution of the system than its overall expenditure share might suggest.

Third, state expenditures as a share of GDP are below peak levels but vary considerably across states. Through much of the 1980s state expenditures on education increased as a share of GDP, reaching a peak of 3.31 percent in 1989–90. By 1992–93 the share had fallen to 3.05 percent before partially recovering to 3.12 percent in 1993–94. As a share of state expenditure, education spending peaked at 24.4 percent in 1989–90, fell sharply, and then recovered to 22.9 percent in 1993–94. States' commitment to education varies. In 1992–93 state education spending ranged from 3.0 to 7.5 percent of domestic product in the major states. As a share of total state expenditure, it ranged from 20 to 28 percent.

Fourth, the distribution of overall government expenditure among educational levels has remained constant over the past two decades. In 1993–94, 46 percent of public education expenditure went to elementary education and 31 percent to secondary. Higher and technical education combined received 17 percent. Although the overall distribution is almost exactly the same as it was 20 years ago, the states' share of expenditure for elementary education has fallen slightly, while the center's has increased. International comparisons suggest that the share for elementary education is low relative to that for secondary education, as is the share for higher education. This distribution reflects the relatively high gross enrollment rate in secondary education.

Fifth, expenditures on elementary education have partially recovered from recent falls. Elementary education was increasingly better financed through the 1980s, suffered a setback in the early 1990s, and recently began showing signs of recovery. As a share of GDP, elementary expenditures rose from 1.47 percent in 1985–86 to 1.68 percent in 1989–90, fell to 1.51 percent in 1992–93, and then rose to 1.60 percent in 1993–94.

Sixth, the composition of expenditures in elementary education is unbalanced. Recent studies indicate that salaries account for roughly 97 percent of education department expenditures in lower primary schooling and 96 percent in upper primary schooling, while libraries, consumables, equipment, and furniture account for only 0.18 percent. But limiting attention to the budgets of education departments obscures another important source (and component) of education expenditures. In most states children from scheduled castes, scheduled tribes, and other backward castes qualify for such incentive programs as free textbooks and school clothing at elementary schools and scholarships at higher levels. In some states girls receive attendance allowances. Much of the cost of these programs is covered from budgets outside the education department. When these programs are included, salaries account for 93 percent of spending, incentives for 5 percent, and all other inputs for just 2 percent.

Small but Strategic Central Government Financing

Although the central government's financial contribution to education is small relative both to that of the states and to other sectors over which it has responsibility, that contribution has become increasingly strategic, shifting toward plan expenditure. Education's share of the central government's total plan expenditure rose from 0.90 percent in 1986 to 2.31 percent in 1992–93 (and a budgeted 3.10 percent in 1993–94), while its share of nonplan expenditures fell from 1.33 percent to 0.94 percent. Plan expenditures now constitute half of all central government expenditure on education, up from a quarter in 1986. As a result of the shift toward plan expenditures, the central government's share of total (state and central) plan expenditure on education has risen from 24 percent during the Sixth Plan to 37 percent in both the Seventh Plan and the current Eighth Plan. The increasing importance of plan expenditures reflects the central government's greater involvement in the levels of education, particularly primary and secondary education, for which it does not have direct responsibility for recurrent funding.

In addition to increasing its share of total plan expenditure on education, the central government has also made substantial changes in sectoral allocations. Projected allocations in the Eighth Plan for elementary and secondary education combined are 61.1 percent, up from 14.4 percent in the Sixth Plan, while the share for universities and technical education has fallen from 61.3 percent in the Sixth Plan to 20.5 percent.

One consequence of these allocative changes is that the central government has expanded its role in plan financing for elementary education relative to the states. In the Sixth Plan the center contributed 9.4 percent of the total. This share increased to 23.1 percent in the Seventh Plan and to a projected 31.3 percent in the Eighth.

Four important observations can be made about plan expenditures and all central government education expenditures between 1989–90 and 1994–95:

- Plan expenditures have shifted toward lower levels of education. The combined share for higher and technical education fell from 53.7 percent in 1989–90 to 42.5 percent in 1994–95, while the share for elementary and adult education increased from 20.0 to 30.5 percent.

- Over the five years the growth in plan expenditures on education at current prices averaged 10.6 percent a year. Annual growth in spending averaged more than 20 percent for elementary education, 12.5 percent for secondary education, and 3.7 percent for higher education. Expenditures in real terms have increased in elementary, secondary, and adult education and have fallen in technical and higher education.

- In elementary education government funding has grown most in nonformal education, whose share of total education expenditure increased from 2.5 to 5.4 percent. Plan expenditures on adult education increased from 6.3 to 8.9 percent, and on primary schooling, from 11.2 to 16.1 percent.

- In 1993–94 plan expenditures on each type of specialized secondary school—for children of transferable government employees and for highly talented pupils—were greater than those on the major primary schooling program, Operation Blackboard.

Potentially the most important new spending program financed through the central government is the DPEP, initiated in mid-1994 (see chapter 1). The DPEP promises to increase the center's funding of primary education by more than 50 percent.

Large but Tightly Constrained State Government Financing

As the major providers and financiers of education in India, state governments' must be able to provide the resources to support universal elementary education (and expanded and higher-quality secondary and higher education). The trends in state government finances indicate considerable problems. State spending on education as a share of GDP has fallen below the level in 1989–90, although education's share of development expenditures has been maintained. The intentions shown in the 1995–96 federal budget to continue reducing the growth in transfers to states, along with accumulated debt, will continue to exert pressure on the education sector until states are able either to increase their own revenues or to shift spending away from other sectors.

States have financed an increasingly smaller share of their expenditures through their own receipts. That share fell from 68 percent in 1975–80 to 60 percent in 1980–85 and to 56 percent in 1985–90. During the 1980s the discrepancy between expenditures and receipts widened as spending grew 16.6 percent a year, while receipts rose only 14.9 percent a year. The inevitable result was a worsening of states' budgetary positions.

Between 1980–81 and 1986–87 a deficit on the states' aggregate revenue (recurrent) account occurred in only one year, 1983–84. But since then large deficits have occurred regularly. These deficits, together with capital expenditures and net lending, constitute the gross fiscal deficit. Across all major states the gross fiscal deficit has increased considerably, particularly since 1988–89, and now averages 4.3 percent of state domestic product. In 10 of the 15 major states the ratio of the gross fiscal deficit to aggregate expenditures exceeds 20 percent. Also disturbing is the fall in the share of borrowing used to cover deficits in the capital account, from 86 percent in 1980 to 50 percent in 1992–93, implying an increasing need to borrow for revenue expenditures.

The budget deficits have led to more borrowing and indebtedness at a time when interest rates have been increasing. As a result, interest and capital repayments are high and growing. Averaged across seven states (Andhra Pradesh, Kerala, Maharashtra, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh), these payments doubled as a share of total state revenue between 1985–86 and 1993–94, from 9.2 to 18.7 percent (World Bank 1995a). The consequence is a reduced share for other forms of expenditure.

These trends contributed to the overall fiscal crisis that helped bring about the general economic crisis of 1991. That economic crisis prompted a number of changes in the conduct of macroeconomic policy, including aspects of public finance. A particularly important trend, resulting in part from the earlier accumulation of debt and in part from lower growth in central transfers, is the fall in the share of development expenditures in total state spending—from 69.5 percent in 1990–91 to an estimated 65.1 percent in 1994–95. As a share of GDP, development spending fell from 11.3 percent in 1985–86 to an estimated 10.0 percent in 1994–95 (World Bank 1995a, table 2.2). This decline has hurt spending on education and other social sectors, although there is recent evidence of a partial recovery. The share of GDP spent by the states on education fell from 3.31 percent in 1989–90 to 3.05 percent in 1992–93, partially recovering to 3.12 percent in 1993–94. This decline resulted more from the overall structure of state expenditure than from any reduction in the relative importance given to education. If states are to increase or even maintain their ability to fund development activities such as elementary education, they will need to restructure their revenues and expenditures.

Any restructuring of overall revenues will need to concentrate on the states' own revenues. The federal budgets of 1994–95 and 1995–96 indicate that the likely long-term growth in discretionary transfers (grants and loans) to state governments will be considerably slower.

Diversity among States

A constant theme of this book is that different states face very different circumstances. This diversity shows up again in the financial circumstances facing, for example, Assam, Bihar, Haryana, Karnataka, Kerala, Maharashtra, Tamil Nadu, and Uttar Pradesh—states with different spending priorities and at different stages of educational development.

Among these eight states, only Assam has had a surplus on the revenue account in each year since 1992–93 (as a result of large loans and grants from the central government), though Karnataka had a relatively small deficit in 1992–93 and surpluses in the next two. In absolute terms Maharashtra's deficits have been large, but as a share of total receipts they have not risen above 7 percent. In Bihar deficits have remained around 10 percent of receipts since 1992–93, while in Uttar Pradesh they increased from less than 9 percent in 1992–93 to almost 14 percent in the following two years. In Kerala deficits have been 10–15 percent of receipts and in Tamil Nadu, 16–23 percent.

Since few states have surpluses on the revenue account and any surpluses are small, states finance most capital expenditures through borrowing. In the eight states, governments financed an average of 56 percent of capital expenditures through loans and advances from the center alone.

All states have a gross fiscal deficit, averaging 22.6 percent of receipts in 1993–94: 13.2 percent in Assam, 15.6 percent in Haryana, 18.1 percent in Karnataka, 20.2 percent in Bihar, 22.2 percent in Maharashtra, 26.1 percent in Tamil Nadu, 27.2 percent in Kerala, and 34.7 percent in Uttar Pradesh. In principle, borrowing is not necessarily a cause for concern; if the resources are used for productive activities, returns will follow. Although revenue and capital accounts in India are not strictly correlated with consumption and investment, there is some correlation. When a large share of the borrowing requirement (gross fiscal deficit) is for financing the revenue account, this places a severe constraint on capital outlays.

In 1993–94 Assam and Haryana had small surpluses on the revenue account and low net borrowing requirements (see table 9.1). Karnataka had a larger surplus but borrowed significantly for capital expenditures. Maharashtra had a relatively modest deficit and borrowed mainly to finance capital requirements. Although Kerala is a moderate borrower, a relatively high share of its borrowings goes to fund its revenue deficit (other states in this position are Himachel Pradesh, Punjab, and West Bengal). In Bihar an even higher share of borrowings funds the revenue deficit. Uttar Pradesh is a relatively high borrower. But the state in the most extreme position is Tamil Nadu, which had to devote more than 60 percent of a high borrowing requirement to cover its revenue deficit. This situation is unlikely to be sustainable.

TABLE 9.1 RELATIONSHIP BETWEEN REVENUE BALANCE AND GROSS FISCAL DEFICIT, EIGHT INDIAN STATES, 1993–94

Gross fiscal deficit as a share of aggregate disbursements (percent)[a]	*Revenue surplus*	*Revenue deficit as a share of gross fiscal deficit*			
		< 20	*20–39*	*40–59*	*60+*
Less than 15	Assam Haryana				
15–20	Karnataka	Maharashtra	Kerala	Bihar	
More than 20			Uttar Pradesh		Tamil Nadu

a. Revenue and capital expenditures and net lending.

Source: Reserve Bank of India, October 1994, statements 14 and 40.

Contrasting Trends in State Education Expenditure

A comparison of education spending as a share of total state spending and of state domestic product in 17 major states reveals contrasting trends (see appendix 3, table C.3). Between 1980 and 1994 education's share of total spending increased in 7 of these states and fell in 10 (see table 9.2). Between 1990 and 1994 the situation was worse, with the share increasing in only 5 states. Using state domestic product as the base gives a more positive picture: in 1980–94 the share of education spending increased in almost every state, although it fell in as many states as it rose in 1990–94.

These trends yield two conclusions: First, over the entire period 1980–94 spending on education grew faster than state income in almost all states, but in more than half, total spending on education grew even faster. Second, since 1990 just over half the states have maintained education spending as a share of state income, while in more than two-thirds education spending has fallen as a share of total spending—in part because of the doubling in interest payments as a share of state expenditures between 1986 and 1994. Within these broad trends, of course, much variation exists among states and at different levels of education.

Varying Trends and Patterns in Eight States

State spending on education as a share of state net domestic product averaged 4.7 percent across all states in 1992–93 (India, Ministry of Human Resource

TABLE 9.2 NUMBER OF INDIAN STATES WHERE EDUCATION EXPENDITURE INCREASED OR DECREASED AS A SHARE OF TOTAL GOVERNMENT EXPENDITURE AND STATE DOMESTIC PRODUCT, 1980–94

Share	*Increased*	*Decreased*
Share of total government expenditure		
1980–94	7	10
1990–94	5	12
Share of state domestic product		
1980–94	15	1
1990–94	8	9

Source: India, Ministry of Human Resource Development, 1995a, 1995c.

Development, 1995c). But this average conceals significant variation. Among eight states reviewed in more detail, Kerala devotes the highest share of state domestic product to education (7.5 percent), followed by Assam (6.0 percent), Bihar (5.0 percent), and Tamil Nadu (4.8 percent), with Haryana (3.0 percent) devoting the lowest share (see table 9.3). Trends in state education spending as a share of state domestic product over the period 1985–86 to 1992–93 also vary. Shares increased in Assam, Bihar, Kerala, Tamil Nadu, and Uttar Pradesh, remained relatively constant in Haryana and Maharashtra, and fell in Karnataka.

Similar patterns and trends show up in education spending as a share of state government expenditure. Kerala again devotes by far the highest share to education (28–32 percent), followed by Assam, with the share for the other states (20–22 percent) about a third less than that in Kerala. But while education spending as a share of state domestic product rose or remained constant in almost all eight states between 1985–86 and 1992–93, as a share of total spending it fell in six of the eight. In only two states did it increase—significantly in Assam and marginally in Maharashtra.

For six of the eight states (excluding Bihar and Uttar Pradesh), the large differences among them in education's share of total expenditure and of state domestic product do not lead to such similar differences in education expenditure per capita. Per capita expenditure is highest in Kerala but within a range of 25 percent in the other five states. Together, these spending indicators imply that Assam, Kerala, and Tamil Nadu must make a greater effort—spending more per capita as a percentage of per capita state income—than the three wealthier states to reach the same level of provision. But these higher-effort states also face greater financial problems.

TABLE 9.3 EDUCATION EXPENDITURE AS A SHARE OF STATE DOMESTIC PRODUCT AND TOTAL BUDGET EXPENDITURE, EIGHT INDIAN STATES, 1985–86 AND 1992–93

(percent, unless otherwise noted)

Indicator	*Assam*	*Bihar*	*Haryana*	*Karnataka*	*Kerala*	*Maharashtra*	*Tamil Nadu*	*Uttar Pradesh*	*Average, eight states*
Share of state domestic product									
1985–86	4.2	4.5	3.0	4.7	7.1	3.4	4.5	3.4	3.8
1992–93	6.0	5.0	3.0	4.3	7.5	3.3	4.8	4.0	4.0
Share of total budget expenditure									
1985–86	23.0	26.4	20.5	22.9	32.1	19.8	25.2	22.9	23.4
1992–93	27.9	22.1	19.9	21.7	28.1	21.9	22.0	20.9	22.6
Per capita education expenditure, 1992–93 (rupees)	311	169	296	277	368	313	298	176	260
Per capita state domestic product, 1992–93 (rupees)	5,154	3,412	9,817	6,378	5,765	9,378	6,344	4,408	5,284

Note: Shows expenditures by state departments of education and by all other departments on education and training, as defined by the Ministry of Human Resource Development.

Source: India, Ministry of Human Resource Development, 1995a, 1995b, 1995c.

The situation in Bihar and Uttar Pradesh is very different. There, per capita expenditures are half those in Kerala and a third less than the average for the eight states. These lower spending levels partly reflect differences in enrollment. But unless official estimates of enrollment are highly inflated in these two states, they also reflect significant differences in expenditures per pupil.

High Nonplan Expenditures

Although plan expenditures (which in principle finance new activities) receive more attention, nonplan expenditures (which finance existing activities) are much higher. For all state education departments in 1992–93, nonplan expenditures averaged 90.7 percent of the total. For elementary education the share was 95.7 percent. Education expenditures by other departments have a higher plan component, reflecting the focus on incentive schemes for socially disadvantaged groups. Of total plan expenditure on education, 40 percent comes from these other departments. But even when their share is included, 88.5 percent of total state education expenditure was nonplan.

Low Plan Expenditures in Several States

For five states—Haryana, Karnataka, Kerala, Maharashtra, and Tamil Nadu—education expenditures ranged from 1.0 to 7.3 percent of total plan expenditure during 1980–93, a period that includes the Sixth and Seventh Plans (see table 9.4). Shares fell in Karnataka and Kerala between the Sixth and Seventh Plans, and the average shares for 1990–91 to 1992–93 in Haryana, Kerala, Maharashtra, and Tamil Nadu were lower than those during the Seventh Plan. Only in

TABLE 9.4 EDUCATION AS A SHARE OF TOTAL PLAN EXPENDITURE, FIVE INDIAN STATES, 1980–97
(percent)

	Sixth Plan,	*Seventh Plan*				*Eighth Plan,*
State	*1980–85*	*19890*	*1990–91*	*1991–92*	*1992–93*	*1992–97*
Haryana	4.2	5.2	4.0	5.4	5.7	7.1
Karnataka	3.1	2.8	5.1	5.2	7.3	7.4
Kerala	4.8	1.9	1.6	1.6	2.0	1.5
Maharashtra	2.1	3.9	1.0	2.7	2.8	2.8
Tamil Nadu	3.6	4.5	2.8	3.4	2.8	4.3

Source: India, Ministry of Human Resource Development tables.

Karnataka and Haryana are recent shares higher than those in previous years. For the Eighth Plan shares are projected to fall in Kerala, Maharashtra, and Tamil Nadu compared with the Seventh Plan. These levels and trends in the shares of plan expenditure imply a low and, on the whole, decreasing priority for education across this sample of states.

Recent Fall and Partial Recovery in Spending on Elementary Education

In seven of the eight states (excluding Bihar) 44–58 percent of state expenditure goes to elementary education and 27–39 percent to secondary schooling (see table 9.5). The average for the eight states is 46.3 percent for elementary education and 32.5 percent for secondary education, a high share compared with that in similar countries. For the period 1989–90 to 1992–93 the most dominant trend was a falling share for higher education, a pattern appearing in all states in this group except Kerala.

Across all states the growth rate for expenditure on elementary education since the mid-1980s has been similar to that for total education expenditure, with both slowing. Between 1984–85 and 1988–89 elementary expenditures at constant prices increased across all states by 49 percent; in the following four years they increased 32 percent. Among the eight states reviewed here, the growth rate for spending on elementary education has been lower than that for total education spending since the mid-1980s in Assam, Karnataka, Kerala, Maharashtra, and Tamil Nadu and has been slowing in all the states. Over the

TABLE 9.5 TOTAL STATE EDUCATION DEPARTMENT EXPENDITURE, BY EDUCATIONAL LEVEL, EIGHT INDIAN STATES, 1992–93

(percent)

State	*Primary*	*Secondary*	*Higher*	*Technical*	*Other*
Assam	58.1	28.3	8.4	1.6	5.4
Bihar	64.0	19.9	10.4	1.6	4.0
Haryana	44.9	35.3	13.3	4.3	2.3
Karnataka	52.0	30.9	12.8	2.4	2.8
Kerala	47.8	30.8	16.1	4.2	1.0
Maharashtra	44.0	38.7	10.2	4.2	2.9
Tamil Nadu	47.8	33.2	10.7	3.5	4.8
Uttar Pradesh	53.6	33.8	8.4	2.8	1.4
All	46.3	32.5	12.9	4.4	3.9

Source: India, Ministry of Human Resource Development, 1995a.

past decade the central government has increased its contribution to elementary education, with the states' share falling from 99.3 percent in 1985–86 to 95.9 percent in 1993–94.

Another approach is to look at the trends in expenditure as a share of GDP. State expenditure on elementary education increased from 1.47 percent of GDP in 1985–86 to 1.68 percent in 1989–90 and then fell to 1.52 percent two years later. In the following years the share recovered to 1.60. The central government's contribution rose from virtually nothing in 1985–86 to 0.08 percent of GDP in 1988–89. Over the next two years it fell, but it has recovered somewhat since 1992–93. Overall, elementary expenditure as a share of GDP rose gradually through the 1980s, peaked in 1989–90, and fell back, partially recovering in recent years.

Unit Costs of Elementary Education to States

Unit costs of elementary education—the annual cost per student to government—varied widely in 1991–92 in the six states reviewed (see table 9.6). On the basis of total expenditures, they were significantly higher in Kerala (Rs912), Maharashtra (Rs860), and Tamil Nadu (Rs856) than in Assam (Rs716), Karnataka (Rs651), or Haryana (Rs645). The simple average for these six states is Rs773, or $25. In comparisons on the basis of nonplan expenditures alone, the range is even greater, with a 60 percent difference between Karnataka and Kerala; here the simple average is Rs716. In Assam, where unit costs can be calculated separately for the first and second cycles of elementary education, they were 55 percent higher in 1991–92 in the second cycle (Rs964) than in the first (Rs622). In Uttar Pradesh they were also higher in the second cycle (Rs768) than in the first (Rs480).

The growth rates of unit costs at current prices have followed a slightly different pattern across states. The highest growth rates have been in Maharashtra and Tamil Nadu—14 and 16 percent annually—and the lowest in Karnataka, at 10.5 percent. On average, unit costs have increased at an annual rate of 12.7 percent.

Deflating costs to a 1985–86 baseline does not alter the pattern of relative expenditures among states, but it does alter the pattern of relative growth rates and the relationship between plan and nonplan expenditures. Using real costs highlights the different experiences in Maharashtra and Tamil Nadu. In these two states the annual growth rate of real unit costs has averaged more than 5 percent; compared with 0.6–2.8 percent in the other four states and with the average rate of 2.7 percent. The growth of nonplan expenditures has been higher than for plan expenditures in all states except Assam and Karnataka (where the overall growth in real terms was less than 1 percent).

TABLE 9.6 UNIT COST OF ELEMENTARY EDUCATION, SIX INDIAN STATES, 1991–92
(rupees, unless otherwise noted)

Type of cost	*Assam*[a]	*Haryana*	*Karnataka*	*Kerala*	*Maharashtra*	*Tamil Nadu*
Unit cost in current prices						
Total	716	645	651	912	860	856
Nonplan	582	584	571	908	826	828
Annual rate of growth (percent)[b]						
Total	12.7	11.9	10.5	11.3	14.0	16.0
Nonplan	10.0	13.6	9.0	11.5	14.0	17.5
Unit cost in constant 1985 prices[c]						
Total	412	371	375	525	495	493
Nonplan	335	337	329	523	475	477
Annual rate of growth (percent)[b]						
Total	2.8	0.6	0.8	1.5	5.1	5.8
Nonplan	0.4	2.9	0.6	1.7	5.2	7.2

Note: Expenditure data are for education departments only.

a. Calculated on the basis of combined primary and upper primary costs so as to be comparable with those for other states.

b. For 1985–86 to 1991–92 for Assam, Karnataka, Kerala, and Tamil Nadu; for 1986–87 to 1991–92 for Maharashtra; and for 1987–88 to 1991–92 for Haryana.

c. Based on the retail price index for urban workers, which forms the basis of the dearness allowance.

Source: World Bank staff calculations based on state government data.

Unit costs of elementary education can be compared with those at other levels in three states—Assam, Maharashtra, and Uttar Pradesh (see table 9.7). Costs in secondary and higher education are significantly higher relative to elementary education in Uttar Pradesh than in the other two states. But overall, differences in unit costs between levels are smaller than those in many other developing countries.

Unit costs can be reduced in two ways: by reducing overall expenditure or by increasing the number of students across which the expenditures are spread. The first of these is often difficult to accomplish, and the second may lead to unproductive overcrowding. Another important measure of resource use is the cost of producing a graduate. Student cost per year may be small, but the system may be so inefficient that high repetition and dropout rates require many more years, on average, for students to complete an education cycle than the number of years in that cycle. Where repetition and dropout rates are high, improving

TABLE 9.7 UNIT COSTS, BY EDUCATIONAL LEVEL, THREE INDIAN STATES, 1991–92

Type of cost and state	*Elementary*	*Secondary*	*University and higher*
Assam			
Unit cost	916	1,100	2,182
Index	1.00	1.54	3.04
Maharashtra			
Unit cost	860	1,350	—
Index	1.00	1.57	—
Uttar Pradesh			
Unit cost	538	2,157	2,850
Index	1.00	4.01	5.30

— Not available.

Source: World Bank staff calculations.

the quality of schooling can increase efficiency in the system, leading to lower costs per graduate.

A rough calculation using repetition and dropout data for Uttar Pradesh and the costs of the IDA–supported basic education project suggests the large gains that would result from improving the quality and efficiency of primary schooling. Applying the student flow model of Cuadra and Fredriksen (1992) gives the number of school-year inputs per graduate of the five-year primary cycle as 8.67 years—73 percent more than if there were no dropouts or repetition. Halving repetition and dropout rates would reduce the number of years per graduate to 6.33 and, assuming constant unit costs, would reduce total costs per graduate 27 percent, from Rs4,161 to Rs3,038. The components of the project that are designed to raise quality and retention will add about 16 percent to the current unit cost. If the project halves repetition and dropout rates, the one-sixth increase in annual cost per pupil will reduce inputs per graduate by a quarter.

State Expenditures Mostly for Teachers' Salaries and Student Incentives

Data on elementary education expenditures disaggregated by input are available across all states only up to 1983–84. The breakdown of expenditures in Tamil Nadu for that year may reflect a typical pattern: 95.8 percent went to salaries and allowances, 1.2 percent to the maintenance of buildings, equipment, and furniture, and 0.03 percent to learning materials. Clearly, teachers' remuneration dominates expenditures. At least in 1983–84, few resources appear to be available from the education department for items other than salaries.

TEACHERS' SALARIES AND BENEFITS. Teachers' salaries are relatively uniform across the major states; they start at about Rs1,200 a month and rise to about Rs2,600 (see chapter 6). In most states these basic rates are more than doubled by cost of living indexing. Added to salaries are the costs of retirement, travel, medical, and insurance benefits and subsidized housing loans. The rates for these benefits, except for pensions, vary across states. Teachers' salary structures and the age structure of the teaching corps are the main determinants of variations in unit costs among states.

STUDENT INCENTIVES. Incentive schemes designed to increase enrollment and retention are common in virtually all states and have been expanding in recent years. The costs of some programs, such as those that provide free textbooks, uniforms, and midday meals to particular groups of beneficiaries, often are borne not by the education department but by the social welfare and tribal welfare departments. These programs reach a substantial number of children. According to the Fifth All-India Education Survey, of 113 million children in primary and middle schools in 1986, 20 million received free midday meals, 14 million received free uniforms, and 30 million received free textbooks (Nayar 1994c). Seventy-seven percent of the beneficiaries were rural children; 33 percent of those receiving midday meals, 45 percent of those receiving free uniforms, and 37 percent of those receiving free textbooks were children from scheduled castes and tribes. Of girls receiving attendance allowances, 73 percent were scheduled caste or scheduled tribe children. Across the country midday meals were provided in 28 percent of primary schools and 24 percent of upper primary schools, uniforms were provided in 47 and 35 percent, and books were provided in 60 and 51 percent. Tilak (1995b) reports similar data from the 1986–87 National Sample Survey.

Although no comprehensive analysis has been done of the expenditure required for the incentive programs or of their effectiveness in encouraging enrollment and retention, several recent studies have suggested differences between midday meal programs and other incentives. Three studies have found that the Tamil Nadu midday meal program has raised attendance and reduced dropout (see box 9.1). In mid-1995 the central government announced the establishment of a nationwide school midday meal program for which it will bear most of the costs. This will mean savings for states already operating such a program.

Two other recent studies, in Haryana and Maharashtra, suggest problems both of targeting and of effectiveness for other incentives (see box 9.2). In

BOX 9.1 TAMIL NADU'S MIDDAY MEAL PROGRAM

The midday meal scheme for schoolchildren was introduced in Tamil Nadu in 1956 for the first time in India, with the objectives of reducing primary school dropouts, promoting universal education, and improving children's nutritional status. The program was expanded in 1982 as the Chief Ministers' Nutritious Noon-Meal Programme (CMNNMP). It provides a free meal of roughly 400 calories, comprising rice, lentils, and vegetables and, more recently, vitamin tablets and an egg every fortnight, to more than 8 million children in 68,000 government-run schools. The cost of a meal per child varies between Rs0.44 and Rs0.90, depending on the age group; state expenditure on this scheme exceeds both annual nonplan investment in education and annual plan investment in agriculture.

Rajan and Jayakumar (1992) studied the impact of the CMNNMP on the enrollment, attendance, and dropout rates of primary students in 17 schools (11 percent of the total) in the Nagercoil educational district of Kanyakumari. Comparisons were made between annual growth rates in these indicators before (1979–82) and after (1983–89) the start of the program.

The CMNNMP raised attendance and reduced dropout in primary schools. The program's apparently negative impact on enrollments was likely the result of both drought and a demographic shift in the periods examined; for both the 1981 and 1991 census, Nagercoil registered lower population growth and fertility rates than the state average. Earlier studies of the Tamil Nadu midday meal program showed similar positive effects of the program on attendance (Devadas 1972; Harris 1991).

AVERAGE ANNUAL CHANGE IN ENROLLMENT, ATTENDANCE, AND DROPOUT RATES IN SAMPLE SCHOOLS BEFORE AND AFTER THE LAUNCH OF THE CMNNMP IN NAGERCOIL, TAMIL NADU, 1979–89

(average annual percent)

Period	*Enrollments*	*Average attendance*	*Dropout*
1979–82	0.25	–0.11	–1.8
1983–89	–0.13	0.37	–6.4

Source: Rajan and Jayakumar 1992.

addition, the programs are expensive. In 1985–90 the cost of incentives in Uttar Pradesh was equivalent to 24 percent of plan expenditures in the education department. Costs may be higher in the states with far more comprehensive programs than those in Uttar Pradesh. Estimates for Tamil Nadu suggest that the incentive programs (including the school feeding program) add 20 percent to the unit costs of primary schooling.

The coverage of incentive programs varies considerably among states. In the four states most involved in the midday meal program in the 1980s—Gujurat, Kerala, Tamil Nadu, and West Bengal—30 percent or more of the

BOX 9.2 SMALL IMPACT OF STUDENT INCENTIVES IN TWO INDIAN STATES

Case studies of incentive schemes in Haryana and Maharashtra found weakly administered programs with little impact on attendance or dropout rates (Sharma, Ramakrishnan, and Seth 1995a, 1995b; see appendix A). The studies covered 15 schools in three districts in each state and 4,500 school-age children. In Haryana 82 percent of the children in the study were attending school regularly, as were 84 percent in Maharashtra. The studies examined school records, used community mapping to identify all families with school-age children, carried out three-year cohort analyses of student flows, and conducted interviews with parents and teachers and focus group discussions with parents.

In Haryana the schemes evaluated provided free textbooks, material for school uniforms, a stationery allowance, and an attendance allowance to scheduled caste and other backward caste children or to scheduled caste girls. In Maharashtra the schemes distributed free textbooks and uniforms to scheduled caste, scheduled tribe, and other backward caste students and provided attendance allowances to families of backward caste girls who were below the poverty line.

Haryana's incentive schemes accounted for 5 percent of primary education expenditures, more than all other categories combined except teachers' salaries. In Maharashtra the share was similar, but a very expensive free milk scheme in one district meant that expenditures on incentives accounted for 17 percent.

Although coverage varied between states and among districts, the studies found that school records indicated far more children receiving incentives

children received free meals in 1986 (see table 9.8). The distribution of free uniforms was less extensive. Only in Andhra Pradesh, Karnataka, and Tamil Nadu did more than 25 percent of children benefit. Of all the incentive programs, those providing free books appear to be the most extensive. Provision in Assam was virtually universal; in West Bengal three-quarters of children were covered, and in Tamil Nadu, about half. Significant programs also existed in Andhra Pradesh, Karnataka, and Madhya Pradesh. Across all states and all programs, Tamil Nadu and West Bengal were the most involved in incentive programs in 1986; Madhya Pradesh also had significant activity in each program. Since 1986 other states, including Haryana and Maharashtra, have expanded their programs significantly.

Conclusions

Earlier chapters have shown the need to increase financial resources for primary education. The burden of doing so must rest primarily with the states.

than parents reported—in Haryana, two to three times more—suggesting that schools received more incentives than were distributed. And in both states parents reported receiving smaller attendance allowances than were indicated on the receipts to which they gave a thumb print.

How did the incentive schemes affect dropout rates? In both states cohort analysis showed that incentives did not bring the dropout rates of students receiving incentives below the average. In Haryana over the three-year period studied 17 percent of students receiving incentives dropped out of school, compared with 20 percent of students not receiving incentives. In Maharashtra the dropout rate among those receiving incentives was 16 percent; among those who did not receive them, it was 17 percent.

Why the small effect? One reason was that attendance allowances were too low to compensate for the costs of schooling. Parents of 152 children not attending school on a regular basis cited the direct and indirect costs of schooling as the reason. In Maharashtra, where 23 children in the study were employed at an average weekly wage of Rs128, attendance allowances can reach Rs5.5 a week, less than 5 percent of a child's weekly wage.

How much do parents value the incentives? In a forced-choice exercise comparing school quality factors (better use of textbooks, more blackboards and charts, additional regular teachers, better buildings, and extra attention to slow learners) with existing incentive schemes, 60 to 90 percent of parents preferred to improve school quality rather than to have more incentives.

Although the central government plays an important role in education—guiding policy and encouraging national initiatives—the state governments provide almost 90 percent of the funding for education and 96 percent for primary schooling. The ability of states to sustain past investments and support new initiatives differs as a result of differences in their past investments in primary education and in their financial health. But in all states additional resources will be required both to maintain or increase access and to improve retention and learning achievement. These needs will have to be met in part by strengthening states' revenue bases.

The analysis in this book also suggests that the central government will need to expand its role in primary education in the medium term for three reasons: the low level of resources that many state governments devote to primary education and the large number of children out of school; the importance at this stage of building the capacity of states and districts to plan and manage education more effectively; and the need for substantial research to select cost-effective strategies. Options for the state and central governments

TABLE 9.8 PRIMARY PUPILS BENEFITING FROM INCENTIVE SCHEMES, SELECTED INDIAN STATES, 1986–87
(percent)

State	*Midday meals*	*Free uniforms*	*Free books*
Andhra Pradesh	—	25.9	25.7
Assam	—	—	98.0
Gujarat	29.2	—	16.5
Haryana	13.6	—	—
Karnataka	—	38.0	34.3
Kerala	32.6	—	—
Madhya Pradesh	19.7	13.7	22.0
Orissa	23.8	—	13.8
Tamil Nadu	47.6	47.6	47.6
West Bengal	41.8	15.8	76.0
All states	15.9	12.2	22.7

— Not available.

Note: Includes all programs benefiting more than 10 percent of the primary students in a state.

Source: Nayar 1994c, app. table 19.

with respect to primary education would, of course, have to be considered in the broader context of administrative decentralization and changing center-state fiscal relations.

Expanding the Central Government's Leadership Role

Central governments' involvement in primary education varies significantly among countries with a federal system of government. In Australia, Canada, and the United States, for example, the central government has virtually no involvement. In countries such as Brazil and Nigeria, however, the central government directly influences funding levels through direct transfers or decrees setting minimum shares of state expenditure. India's central government plays a role between these two extremes. It is responsible for developing many aspects of policy and for funding centrally sponsored plan schemes in primary education, and it provides general financial transfers to states. Its allocations to education under the Eighth Plan have increased significantly, particularly for elementary education. But the overall share of education in the central government's total spending remains low.

Over the past two years the central government and state chief ministers have often reiterated their intention to ensure that public resources for education increase to 6 percent of GNP during the Ninth Plan, expected to begin in 1997. Current spending (by both education departments and other departments) is about 4 percent of GNP. With plan expenditures now about 0.4 percent of GNP, reaching the target through plan expenditures would require a fivefold increase. Achieving this spending goal will require efforts by both central and state governments and much thought about how best to use central transfers to trigger maximum additional state expenditures.

Gradually expanding the DPEP—paying careful attention to cost-effectiveness—would be essential during the medium term to provide a bridging mechanism as states undergo fiscal reforms. Untied grants to states for educational development might also be considered under terms that do not allow substitution and that require a commitment by the state government either to increase the growth of its education spending (for low-spending states such as Haryana) or to maintain the share of education in total spending (for high-spending states such as Kerala) and generally shift expenditures toward the social sectors.

The central government might also wish to address educational inequality across states more broadly by focusing the criteria for distributing general transfers more on need, balanced by an increased emphasis on equal fiscal effort across states, and by targeting grants for the centrally sponsored schemes to ensure that states which have made strong efforts to raise revenues and allocate expenditure toward the social sectors are not penalized and that those with low tax efforts or expenditure patterns biased against the social sectors are not unduly rewarded.

Strengthening States' Public Finances and Education Expenditure

Several trends in state government finances since the mid-1980s (including much higher interest payments, a lower share for development expenditure, and lower capital expenditures) suggest a structural deterioration in most states' public finance position that has been exacerbated by the slower growth in central government transfers since 1991–92.

Governments have cushioned education somewhat by taking actions to maintain its share of development expenditures. But since the growth of revenue expenditures and the share of development expenditures have both fallen in recent years, education expenditure as a share of GDP has slipped below its 1989–90 level. If current spending trends and patterns continue, the result will be a further decline in the share of state resources devoted to education.

Expenditures on education are a small share of total state plan expenditures, averaging less than 5.0 percent and ranging from 1.5 to more than 7.0 percent. In some states the share for education in the Eighth Plan (1992–97) is lower than that in the Seventh. Tied grants for education from the central government to the states increased dramatically between 1986 and 1990. But since then the growth has slowed, averaging 3.7 percent between 1990 and 1994 (in current prices).

India's largest states face acute financial problems. All eight states focused on in this chapter have gross fiscal deficits (equal to 60 percent of revenue expenditures in Tamil Nadu and more than 40 percent in Bihar), and all except Assam and Karnataka have revenue account deficits. Assam depends on central grants for almost half its receipts and generates only 29 percent of its own revenues. Even the relatively wealthy state of Maharashtra is building up large debt obligations.

Among these eight states, there is enormous diversity in education funding. Education spending ranges between 20 and 28 percent of the total budget and between 19 and 34 percent of the nonplan budget. The education financing effort by the states also varies widely as a share of state income, from 3.0 to 7.5 percent. Plan allocations to education in the eight states are much smaller than nonplan allocations, but here again the variations are wide. In the Eighth Plan the shares for education are projected to be 1.5–7.4 percent. But in the first two years most states did not allocate even the projected shares. The pattern of allocations to states for centrally sponsored schemes does not appear to reflect any systematic attempt to concentrate resources in the less educationally developed states, although the DPEP is focusing on below-average districts.

The trends in revenue deficits in the major states suggest that boosting budgetary resources for education will require significant changes in the conduct of fiscal policy—increasing revenues, restructuring expenditures, and becoming more cost-effective in the provision of schooling. Several strategies could be considered:

- Develop a wider revenue base to improve resource mobilization.

- Allocate at least the share of plan expenditure for primary education projected for the Eighth Plan period and prepare for significant increases (as planned) in the shares under the Ninth Plan beginning in 1997.

- Focus on reducing repetition and dropout rates to reduce the cost per graduate. Lowering repetition rates would make it possible to accommodate many more students for marginal increases in expenditure.

- Review the efficiency and effectiveness of incentive programs. Even without the school feeding programs, twice as much is spent on incentive programs as is spent on all nonteacher school inputs. The little evidence that exists suggests that several of the major components of incentive and scholarship programs tend to be inefficiently administered and to have no real effect on enrollment and retention. More effective might be the free distribution of higher-quality textbooks.

- Increase expenditure on education through a general restructuring of total expenditures. There is scope for such a restructuring: losses by the state electricity corporations are two and a half times state plan expenditures on education.

- Develop financial arrangements for the planned third tier of government, at the district level, that will (a) ensure the development of adequate financing for these governments' responsibilities in education and the existence of incentives not to divert such funds; (b) address inequalities within states through policies that effect differential transfers from the state to lower levels of government; and (c) enable local governments to raise additional revenues from taxes that may be less available to state governments.

In the final chapter, estimates are made of the cost of providing universal primary schooling. These are compared with the patterns of projected past trends in education finances. The implications for both the central government and state governments, briefly considered in this chapter, are discussed further.

Technical Note

The estimates of unit costs in table 9.6 are based on total expenditures of state education departments on elementary education and official enrollment. The results may not be accurate for a number of reasons; among the most important are the inaccuracies in enrollment figures and the omission of expenditures from other departments. Furthermore, these estimates do not provide a clear picture of the variations in unit costs across schools and districts within states. To increase the knowledge of the level, composition, and variation in unit costs of primary schooling, case studies were undertaken in Haryana and Maharashtra (Sharma, Ramakrishnan, and Seth 1995c, 1995d). They are described in appendix B.

These studies surveyed in detail 15 schools in three districts in Haryana and three in Maharashtra between November 1994 and January 1995. In these six districts the unit cost ranged from Rs1,074 to Rs1,364, except in one district in Haryana, where it was Rs618 (see table 9.9). In Haryana the average was Rs1,037, and in Maharashtra it was Rs1,139. Subtracting the average unit capital cost (calculated by amortizing building costs) of Rs37 in Haryana and Rs51 in Maharashtra gives unit recurrent costs of Rs1,000 and Rs1,088.

TABLE 9.9 UNIT COSTS OF ELEMENTARY SCHOOLING IN SIX DISTRICTS, BY MAJOR ITEM, HARYANA AND MAHARASHTRA, 1993–94

(percent, unless otherwise noted)

	Haryana			*Maharashtra*			
Type of cost	*Sirsa*	*Hissar*	*Jind*	*Aurang*	*Nanded*	*Parbhani*	*Average*
Salaries	90.6	92.8	95.8	90.8	95.0	93.4	93.0
Incentives	7.7	6.3	2.5	5.1	2.6	4.3	4.8
Operation							
Blackboard materials	0.5	0.1	0.3	1.6	0.7	0.6	0.6
Other[a]	1.2	0.8	1.4	2.5	1.7	1.7	1.6
Total unit cost (rupees)	618	1,364	1,130	1,074	1,221	1,123	1,088

a. Includes furniture, educational materials other than Operation Blackboard materials, electricity and water bills, minor renovations, stationery, inspection, and in-service training costs.

Source: Sharma, Ramakrishnan, and Seth 1995c, 1995d.

On average in the two states, 93 percent of total recurrent costs go to salaries, 5 percent to student incentive schemes (5.5 percent in Haryana and 4.0 percent in Maharashtra), and just over 2 percent to all other items for the upkeep and operation of the schools (1.4 and 2.9 percent). Attendance allowances and scholarships dominate expenditures on incentives, accounting for about 60 percent in both states (see table 9.10). Provision of textbooks and stationery accounts for less than 20 percent of the total cost of incentives.

TABLE 9.10 UNIT COSTS OF INCENTIVE PROGRAMS, HARYANA AND MAHARASHTRA, 1993–94

(rupees per enrolled student)

Program	*Haryana*	*Maharashtra*
Uniforms	10.5	11.4
Stationery	3.5	1.3
Textbooks	5.7	6.1
Scholarships	18.8	9.4
Attendance allowances	14.1	18.5
Total	52.6	46.7

Source: Sharma, Ramakrishnan, and Seth 1995c, 1995d.

The estimated unit recurrent costs of Rs1,000 for Haryana and Rs1,088 for Maharashtra for 1993–94 can be compared with crude estimates of Rs764 and Rs1,176 based on the 1991–92 figures in table 9.6 and adjusted for trend increases. The estimates for Maharashtra are reasonably similar, but those for Haryana are not. Part of the explanation is that several of the incentive programs are funded from departments other than education. Another part may be that the enrollment figures used in the aggregate calculations are overestimates. Whatever the cause of the disparity, the case study results are likely to be more accurate. Roughly averaging between the estimates for the two states gives a recurrent unit cost for 1993–94 of Rs1,050.

CHAPTER TEN

Financing More and Better Primary Education

India has the financial potential to provide all its children with primary education of a higher quality. But having the financial potential to do so does not mean it will be easy. Many states in India still have a long way to go before all children are in school. To provide better, universal primary schooling will require a substantial increase in state spending on primary schooling, as well as an increase in central government transfers and a strengthening of institutional capacity. Obtaining additional resources for primary education could be difficult during a period of fiscal adjustment. But raising the average educational attainment of the adult population promises benefits that are worth the effort required: greater economic productivity, better health and nutrition, lower population growth, and a population more empowered and able to enjoy a higher standard of living.

Because of the diversity across India's states, the challenges in providing a reasonable quality of primary schooling for all children, and the solutions, will vary widely among the states. This chapter assumes that an education system of reasonable quality will provide a classroom and a teacher for every 40 children, a minimum package of instructional materials for each child, classroom, and school, and—consistent with general state policies for increasing enrollment and retention—incentives to offset part of the direct and indirect costs of education for families. In practice, variations in the provision of education services are likely to be substantial across states and districts. What is included in the instructional materials could vary from state to state and district to district. The student-teacher ratio in the classroom could vary within schools or could be constant across all grades. And different combinations of inputs could be purchased by different schools, districts, or states. The analysis in this chapter therefore had to incorporate many assumptions, and its results should be regarded as approximations.

Financing Selective Interventions

Consideration of strategies for providing higher-quality primary schooling for all children raises two important sets of questions: First, what are the resource requirements both across the country as a whole and for the least educationally developed states, and how do these requirements compare with trends in past expenditure? And second, what would those requirements mean for states' revenue generation and expenditure patterns and for center-state transfers? The next two sections address these questions in turn, using 2007, expected to be the last year of the Tenth Plan period, as the target date for achieving universal primary schooling.

What Are the Resource Requirements?

Resource requirements have been estimated for three scenarios: maintaining the existing system for the estimated number of children ages 6–10 now in school, expanding the system to accommodate the children ages 6–10 not now in school, and improving the quality of the schooling offered to all students. Some portion of children not in school may be reached through nonformal or alternative education programs. Unit cost estimates for most such programs are not available. However, data from the centrally sponsored scheme for nonformal education and from Lok Jumbish suggest that good-quality nonformal education or alternative education programs could cost approximately the same, per student, as formal schooling. Therefore, the cost estimates for the resources necessary to provide all children ages 6–10 a complete primary education or its equivalent through alternative delivery mechanisms are based on the costs of formal education, which are known.[1]

MAINTAINING THE EXISTING SYSTEM. The first step in calculating the cost of providing universal schooling of a higher quality by 2007 is to establish the base by projecting the costs of the existing system for the 73.5 million children ages 6–10 who now attend school. The projections are based on three assumptions. First, the 1.98 million teaching posts filled in 1993 would remain, and average salaries would increase in real terms 4 percent annually. Second, 50 percent of current students ages 6–10 would qualify for a set of four free textbooks costing an average of Rs10 per book. And third, 20 percent of current students ages 6–10 would qualify for other incentives, costing, on average, Rs50 per student. The projections show that the cost of maintaining the system would rise from about Rs80 billion in 1996 to more than Rs121 billion in 2007 at 1993 prices (see table 10.1).[2]

EXPANDING COVERAGE. Simply maintaining the existing system would continue to exclude the millions of children ages 6–10 who are out of school. This number, estimated at 32 million in 1995, could grow to 39 million by 2007. Expansion will be necessary not only to provide enough school places for the entire primary-school-age cohort, but also, in the medium term, to provide places for overage students. To establish a school system with the capacity to provide one classroom and one teacher for every 40 children ages 6–10 in 2007 would require constructing more than 1.32 million more classrooms and hiring 739,000 more teachers. And many of the additional students would need textbooks and incentives.

In calculating the annual costs of expanding coverage, five assumptions are made. First, the 1.3 million classrooms would be built at the rate of 110,250 a year. Second, these classrooms would be built by members of the local community, supervised by technical specialists, using durable but locally available materials. This construction strategy has been found to be the most cost-effective. Using this approach in Uttar Pradesh, communities have constructed two-classroom-block schools for about Rs220,000 each. An analysis of the cost and durability of wall and roofing materials shows that durable materials, although initially more expensive than less durable materials, are less expensive on an annualized basis because of their longer use (appendix C, table C.8). Third, the teachers recruited for these new classrooms would have 12 years of pre-service general education and enter at an average salary of Rs1,500 a month plus a dearness allowance, for an average annual salary of Rs40,500, and this salary would increase in real terms 4 percent annually. Fourth, a minimum of four textbooks would be required for half of all new students, at a cost of about Rs10 per book. And 30 percent of the new students would qualify for incentives, a higher share than the present 15–20 percent, reflecting the need to encourage children of the poorest families to enroll.

Based on these assumptions, the estimated annual costs for expanding the system to accommodate all children ages 6–10 by 2007 would grow from Rs15 billion for the first year of an accelerated expansion program to Rs64 billion for the last year (again at 1993 prices). Over the 12 years the cost would total Rs440 billion.

The cost for expansion would be high—in 2007, equal to about half the cost of maintaining the existing system. But as chapters 4 and 5 showed, the out-

TABLE 10.1 RESOURCE REQUIREMENTS, AVAILABILITY, AND FINANCING GAPS FOR EXPANDED AND BETTER-QUALITY PRIMARY EDUCATION, INDIA, 1996–2007

(millions of rupees at constant 1993 prices,

Indicator	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Maintaining the existing system												
Teachers' salaries	76,993	80,074	83,278	86,610	90,074	93,677	97,422	101,319	105,372	109,588	113,971	118,530
Incentives	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1.447
Textbooks and materials	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447	1,447
Subtotal	79,886	82,968	86,172	89,503	92,967	96,570	100,316	104,213	108,266	112,482	116,864	121,423
Expanding coverage												
School construction	12,128	12,128	12,128	12,128	12,128	12,128	12,128	12,128	12,128	12,128	12,128	12,128
Salaries for new teachers	2,696	5,609	8,750	12,133	15,772	19,684	23,883	28,387	33,213	38,379	43,906	49,814
Textbooks and instructional materials	65	130	195	260	325	390	455	520	585	650	715	780
Incentives	97	195	292	390	487	585	682	780	877	975	1,072	1,170
Subtotal	14,986	18,061	21,365	24,910	28,712	32,786	37,148	41,814	46,803	52,132	57,821	63,891

(Table continues on the following page.)

TABLE 10.1 (*continued*)

Indicator	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Improving quality												
Rehabilitation of classrooms	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052
Water and toilets	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115
Classroom instructional materials	785	840	895	951	1,006	1,061	1,116	1,171	1,226	1,281	1,336	1,392
School instructional materials	785	840	895	951	1,006	1,061	1,116	1,171	1,226	1,281	1,336	1,392
In-service teacher training	1,025	1,059	1,092	1,125	1,158	1,192	1,225	1,258	1,292	1,325	1,358	1,391
Subtotal	9,762	9,905	10,049	10,192	10,336	10,479	10,623	10,766	10,910	11,053	11,197	11,341
Financing												
Total resources required	104,635	110,934	117,585	124,605	132,015	139,836	148,087	156,793	165,978	175,667	185,882	196,655
Total resources available	77,169	82,417	88,021	94,006	100,399	107,226	114,517	122,305	130,621	139,504	148,990	159,121
Financing gap	27,465	28,517	29,564	30,599	31,616	32,609	33,569	34,488	35,360	36,163	36,892	37,534

Source: World Bank staff calculations.

come of the present system of primary education is often low learning and high dropout rates, particularly for rural girls, the poor, and scheduled caste and scheduled tribe children. Because the demand for poor-quality education will always be weak, reaching those children not in school will require providing a better-quality education.

IMPROVING QUALITY. National policy clearly recognizes that without sustained and systematic efforts to improve the quality of teaching and increase learning achievement, building more schools would simply lead to a larger inefficient system. At the same time, investment to improve primary schooling will need to be cost-effective.

What do schools most need for improved quality? The factors associated with quality vary from state to state (and, within states, from district to district). The basket of inputs needed to improve quality may therefore vary from school to school. The calculations of the cost for improving school quality are based on five assumptions about the inputs needed. First, about 30 percent of classrooms would need rebuilding or significant rehabilitation at Rs110,000 per classroom. Second, about 80 percent of schools would need water (Rs25,000 per well) and toilet facilities (Rs20,000 per toilet), for a total of Rs65,000 per school. Third, each classroom would receive Rs500 a year for consumable instructional materials. Fourth, each school would receive Rs2,000 a year for other instructional materials. Fifth, each teacher would receive two weeks a year of residential in-service training and one day a month of follow-up at a cost of Rs500 a year. These inputs broadly constitute the basket provided through the DPEP.

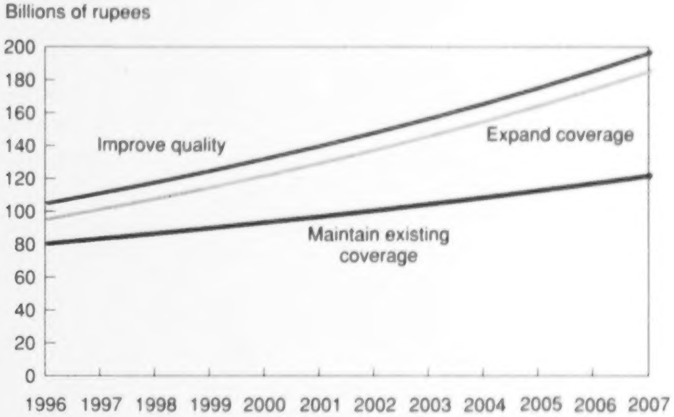
With this package, the annual cost for improving the quality of all existing and new primary schools in India would increase from Rs9.8 billion in the first year to Rs11.3 billion in the final year of the 12-year quality improvement program. The total cost would be Rs127 billion, equivalent to just under 30 percent of the cost of expansion.

What would it cost to both expand the system and improve its quality? The cost in the twelfth and final year of the program of achieving higher-quality primary schooling for all children ages 6–10 would be Rs197 billion, compared with a cost of almost Rs80 billion in 1996 to maintain the existing system (see figure 10.1).

The results of these calculations are only approximations, and they could change, for example, when data from the Sixth All-India Education Survey on the stock of classrooms in India are published. But they emphasize that a minimum package of inputs for improving the quality of education in India (as elsewhere) would cost only a small fraction of the total costs of a school system—here, about 5 percent. Yet those inputs could yield enormous benefits

A minimum package of inputs for improving primary school quality would cost only a small fraction of the total cost of education for all.

FIGURE 10.1 ESTIMATED COST OF PRIMARY EDUCATION FOR ALL CHILDREN AGES 6–10, INDIA, 1996–2007



such as improving the capacity of schools to retain students and increasing what students learn.

What Resources Are Available?

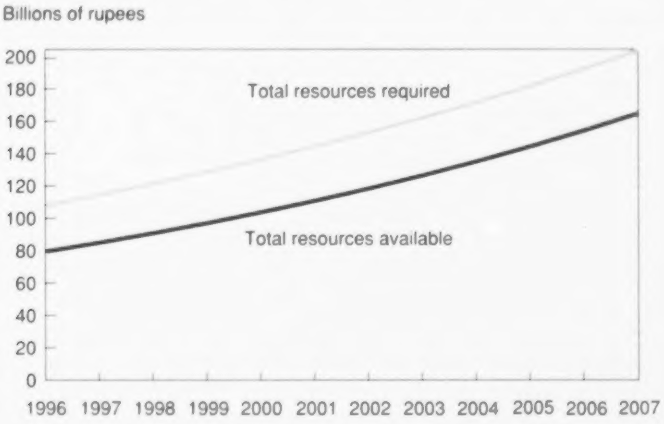
Between 1980–81 and 1992–93 the annual real growth of expenditure on elementary education (and, by assumption, on primary education) in India averaged 6.8 percent. Government expenditure data do not differentiate between the two components of elementary education, primary and upper primary schooling. Teacher-to-pupil ratios for the two levels indicate that unit costs in upper primary are 50 percent higher than in primary grades. Weighting 1992–93 enrollments by grade by the ratio of unit costs suggests that 60 percent of total expenditures on elementary education are for upper primary schooling. Projections of national and state financing capacity for primary education that assume a continuation of this trend in real expenditure suggest that expenditures of Rs159 billion could be supported in 2007. These expenditures would cover just over 80 percent of the annual cost for an expanded and higher-quality system, leaving an annual financing gap of Rs37 billion and a cumulative gap of Rs380 billion (see figure 10.2).

This estimate of the resources available for primary schooling is reasonably encouraging. Two caveats should be kept in mind, however. First, the projections assume salary increases limited to 4 percent a year and would be sensitive to any increase above this rate. Second, the trend rate of growth in spending was higher than the rate of economic growth over the same period, which averaged 5.2 percent. Spending by departments of education on elementary education as a share of GDP increased from 1.33 percent in 1980–81 to 1.70 in 1992–93. The spending required in 2007 for universal schooling (and continued expansion of upper primary schooling) as a share of GDP will depend on the rate of economic growth as well as on the growth of education expenditure.

Approximate estimations suggest that the required resources are within reach if India achieves its policy objective of increasing education spending from the current 3.7 percent of GDP to 6 percent by the end of the Ninth Plan. Assuming a rate of economic growth of 5 percent a year and a constant share of the education budget for primary education, a 6 percent share of GDP for education would provide about Rs207 billion in 2007, slightly more than the estimated requirements of Rs195 billion. Movement toward the 6 percent target

The financing gap could grow from 27 billion rupees to 37 billion rupees between 1996 and 2007.

FIGURE 10.2 ESTIMATED FINANCING GAP, INDIA, 1996–2007



would need to begin immediately to minimize the buildup of the deficit during the intervening period.

Where Are Resources Needed Most?

The calculations and conclusions above are for India as a whole. But differences between states—in fertility levels, primary school coverage, and financial effort for education—mean that different states face very different financial requirements in providing higher-quality schooling for all children. At one extreme is Kerala, where almost all children ages 6–10 are in school, and fertility levels have been falling for many years. Here, no additional resources may be required for expansion, although additional resources would be required for improving quality. At the other extreme are the six states where 75 percent of all the children out of school in India live: Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal.

Spending on primary education in these six states is now roughly Rs36 billion a year. To continue educating the same number of children, expenditures would need to increase to Rs52 billion a year by the twelfth year of the program. To achieve universal schooling in 2007 would require an additional Rs55 billion. (This estimate assumes that the six states' need for all inputs in expanding schooling are roughly in line with their need for teachers—six out of seven of all additional teachers required across the country.) And improving quality would require an additional Rs5.7 billion (roughly half the total for all India). The total requirement in 2007 for these six states would be Rs112 billion.

The additional resources needed for these six states are approximately double those likely to be available on the basis of past trends. Real financial resources for primary schooling in these six states with the most pressing education problems have increased 7 percent a year. With continued growth at this rate, about Rs77 billion would be available in 2007. The calculations of financing requirements and availability suggest that maintaining the trends in expenditures would provide an additional Rs41 billion in 2007, short of the required increase of about Rs76 billion. To reach that figure would require increasing the growth rate of spending over the entire period to 13 percent a year.

Closing the Financing Gap

The calculations of resource requirements and availability have necessarily relied on many assumptions, in part because of a lack of precise data—such as on the division of elementary expenditures between the primary and upper primary levels—and in part because of a lack of knowledge about the future, such as how fast teachers' real salaries will grow. The overall conclusions are nevertheless sufficiently robust to warrant serious consideration.

A continuation of the trend growth rate of expenditures on elementary education across all states combined might provide about 80 percent of the resources needed to achieve universal schooling of a higher quality than at present. Thus, because the central government provides only about 4 percent of the resources for elementary schooling, combined state finances would be almost sufficient, requiring only a moderate increase in their rate of growth (from 6.8 to 8.5 percent). And the requirements fall within the range of resources likely to be available if the policy objective of devoting 6 percent of GDP to education is achieved—as long as the economic growth rate averages at least 5 percent a year.

But there are several reasons for caution. First, the expenditure trend since 1980 was based on an average rate of economic growth of 5.2 percent, a rate that has proved to be unsustainable. Although economic policy changes since 1991 have been aimed at raising the sustainable rate of growth, their long-term effect is still unknown. As long as economic growth averages less than 6.8 percent a year, a greater share of states' wealth must be devoted to elementary education to maintain the trend in spending.

Second, the high trend rate of expenditure growth through the 1980s may have simply funded large increases in teachers' salaries. The assumption of 4 percent annual growth in salaries may be too low. Since teachers' salaries account for about 93 percent of the unit recurrent costs of primary schooling, growth of more than 4 percent a year would significantly boost the resource requirements. Moreover, data on capital expenditure in education indicate that few resources are spent on school buildings. In 1992–93, for example, state governments spent only Rs2.86 billion on construction across the education sector, even though Rs12 billion a year are needed annually through 2007 to provide a classroom for every 40 children. Thus, even if past expenditure trends can be maintained or increased, the pattern of expenditure will need to shift toward capital items.

Changes in the key assumptions about economic growth and growth in teachers' real salaries would change the conclusion that raising education spending from 3.7 percent of GDP to 6.0 percent would provide sufficient resources. If the economy grows faster or slower than 5 percent, and if teachers' real salaries grow faster than 4 percent, different financing requirements and gaps would result (see table 10.2).

If GDP grows at 4 percent a year while India raises education spending to 6 percent of GDP, there will be a financing gap at each assumed rate of annual salary increase (between 4 and 6 percent). With GDP growing at 5 percent a

TABLE 10.2 RESOURCE REQUIREMENTS, AVAILABILITY, AND FINANCING GAPS UNDER VARIOUS ASSUMPTIONS ABOUT GROWTH RATES OF GDP AND TEACHERS' SALARIES, INDIA

Case	*Salary growth rate (percent)*	*Resource requirement (billions of rupees)*	*GDP growth rate (percent)*	*Resource availability (billions of rupees)*	*Financing gap (billions of rupees)*
Case 1	4	195	4	182	-13
	5	213	4	182	-31
	6	233	4	182	-51
Case 2	4	195	5	207	12
	5	213	5	207	-6
	6	233	5	207	-26
Case 3	4	195	6	244	49
	5	213	6	244	31
	6	233	6	244	11

Source: World Bank staff calculations.

year, there will be a financing gap if salary growth exceeds 4 percent a year. With GDP growing at 6 percent a year, there will be no financing gap as long as salary increases do not exceed 6 percent a year. All these figures are estimates, of course, but they highlight the importance of supporting efforts to increase education spending as a share of GDP with buoyant rates of economic growth and control over salary increases.

There is a third more substantive reason why the all-states comparison of resource requirements and availability needs qualification: states' resources are not pooled. Resource gaps in the six states with the greatest needs in education—amounting to half the additional resources required—will not be filled by transfers from other states. The alternatives are to postpone the achievement of five years of schooling for each child in these states for another decade, to double the growth rate in state expenditure on primary education, or to increase resource transfers from the central government. Clearly the first alternative is both economically and socially counterproductive and not acceptable. Each of the other two alternatives is considered below.

Increasing State Government Expenditures

The real growth of spending on elementary education since 1980–81 in the six states has been slightly higher than the average for all states. It has been highest in Madhya Pradesh and Uttar Pradesh and lowest in West Bengal and Bihar, with the lowest rate 5.2 percent.

How realistic is it to expect higher growth over the next decade or so? That depends on both the rate of growth of government income and changes in the pattern of expenditure. Government income growth depends partly on economic growth, and there is general optimism about both. In addition, several potential sources of income have not been tapped. Cost recovery could be introduced for the economic services that government provides by, for example, introducing new tariff structures for electric power. And taxes could be widened and deepened, by privatizing the collection of *octroi* (interstate trade taxes), reforming property taxation, establishing new luxury taxes, and reforming sales taxes and simplifying their administration (World Bank 1995a).

Changes in the pattern of expenditure are equally important. Several states have taken initiatives to reduce expenditures and increase revenues, including privatizing, closing, and reorganizing public enterprises, introducing strong zero-based budgeting or other expenditure review mechanisms, permitting private participation in power generation, and reducing operating costs. But the effect of these measures remains inadequate relative to the need for additional resources for sectors such as primary education. An account of the public finance situation in Andhra Pradesh demonstrates measures which, in principle, would provide such resources (see box 10.1).

Overall, it is realistic to assume that the governments of the six states with the greatest needs in education will be able to increase the growth rate of their expenditure on primary education if economic growth rates are buoyant and public finances are restructured. But it may not be realistic to suppose that they can double it.

Increasing Central Government Transfers

Although primary schooling is primarily the responsibility of state governments, over the next decade the central government might complement states' broad reforms in public finances by increasing transfers to the governments of the least educationally developed states. In principle, these transfers could be general grants to enable states to increase funding for primary education or specific grants to ensure it.

The political economy issues involved and detailed recommendations on the mechanisms required are beyond the scope of this study. But the commitment made by the National Development Council (representing both central and state governments), and frequently endorsed by central government ministers of all major parties, to raise education expenditure to 6 percent of GDP by the end of the Ninth Plan (2002) is encouraging. The current share, generously

BOX 10.1 ACHIEVING UNIVERSAL PRIMARY EDUCATION IN ANDHRA PRADESH

How financially feasible is the objective of achieving universal primary schooling across Andhra Pradesh by 2007? To find out, calculations were done for the state similar to those done for the country (based on World Bank staff calculations; see table 10.1). First, the costs of projecting the existing system forward were calculated, and to these were added the cost of a phased expansion to provide for all children ages 6–10 by 2007 and the cost of improving the quality of schooling for all pupils. Second, current expenditures on primary schooling were projected forward, at constant prices, using the trend for 1980–81 to 1992–93. Comparison of the annual resource requirement and availability indicates a shortfall of 35–45 percent a year and 43 percent for the period as a whole.

The share of state domestic product (SDP) spent on education has fallen—from 4.02 percent in 1989–90 to 3.43 percent in 1992–93 to a budgeted 3.16 percent in 1995–96. The share for primary schooling (grades 1–5) in 1992–93 was almost 1.0 percent and is now about 0.9 percent. The projections suggest that the share would need to increase to roughly 1.4 percent for the whole of the period to 2007 to finance universal primary schooling.

The prospects for attaining this share may have been dimmed by two recent measures of the Andhra Pradesh government. It banned the sale of alcohol, which reduced revenues, and it substantially increased the consumer subsidy on rice, boosting the cost of the rice subsidy for 1995–96 by an estimated 2.1 percent of SDP. In principle reducing the subsidy would allow increased expenditures on other services. Diverting just a quarter of the expenditures on the rice subsidy to primary education would fund universal schooling. Of course, there would also be other claims for any resources freed—the share of SDP spent on health and family welfare has fallen by a quarter since 1989–90, and the requirements for improving roads and ports are also high. Moreover, it is not clear that the state can sustain its current level of expenditure. The fiscal deficit is rising, and interest payments have increased from 1.8 percent of SDP in 1991–92 to 2.6 percent.

What are the conclusions? Although in principle it would be possible to provide the funding needed for universal schooling in Andhra Pradesh by redirecting part of the savings resulting from a reduced rice subsidy, there would be strong competition for any such savings. And because current state expenditures may not be sustainable, reducing spending on one item might not result in higher spending on others. Providing the required resources for universal primary education may require a comprehensive restructuring of public finances.

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defined, is 4 percent. Raising this share to 6 percent would imply increasing real expenditure by about 9.5 percent a year, assuming 5 percent growth in GDP—by less if GDP growth is higher. The political will for the central government to augment increased spending by the states so that all can achieve universal primary schooling appears to exist. This study gives some indication of how much would be required. The next step is to devise the mechanisms for transfers.

The central government's main programs for assisting the development of primary schooling are Operation Blackboard and, increasingly, the District Primary Education Program. Although Operation Blackboard is useful for reaching the worst-served villages (those with schools with one teacher and one classroom) and the DPEP is useful for assisting districts with below-average female literacy, neither yet provides the mechanisms for transferring the sizable resources required to provide universal schooling.

The DPEP's purpose is to enhance quality, and it puts limits on how much of a grant can be used to fund capital works and teachers' salaries. Changes to the program's eligibility criteria and to its composition would be required if it were to be the single channel for transferring resources to achieve universal schooling. Since the program is beginning to operate successfully, it may be preferable to maintain it as it is and to design a separate program that is more flexible in the provision of funding for capital works and teachers' salaries. And in any central government initiative it will be important to ensure that the state governments also increase their financial commitment beyond that required for participation in the DPEP.

Going Beyond Minimum Needs

The financing requirements for an improved and expanded primary education system calculated here should be seen as minimum estimates. They do not take into account the need to provide schooling for the many overage children now in primary school, to develop necessary institutional capacity, or to satisfy increased demand for upper primary schooling, which will increase the competition for government resources and could limit the resources available for primary schooling. Meeting these needs will require additional resources: schooling overage students alone could raise the total resource requirement for primary schooling by a third.

Providing for Overage Children

Overage children now swell primary enrollment in all states as a result of repetition as well as enrollment drives held when new schools opened in previously unserved communities. States could meet the temporary bulge in the demand for schooling created by late enrollment by instituting temporary measures, such as double shifts or temporary classrooms. Double shifts would allow a school to be used for more of the day, particularly if it is electrified and can be staffed by a mix of experienced and newly appointed teachers. Local communities would need to be consulted on school schedules. As more children enter school at the official age (5–7 years, depending on the state), overcrowding due to late enrollment is likely to diminish. But overcrowding due to repetition is likely to persist until the major causes of repetition are addressed or children older than the official school age are required to enroll in alternative education programs.

Strengthening Institutional Capacity

The primary education reforms called for in the National Policy for Education will require developing institutional capacity at all levels. At the national level, a professional base for strengthening state-level institutions will need to be established, drawing on the strength of nongovernmental institutions. At the state level, the capacity of technical institutions to provide support and assistance to intermediate-level organizations will need to be strengthened. At the intermediate level, new institutions—such as block resource centers, cluster resource centers, and DIETs—will also need strengthening as they begin to take on new responsibilities. At the local level, village education committees will need training in how to monitor enrollment and student and teacher attendance, how to activate the community, and how to mobilize resources. And the head teacher will need to be trained to serve as an effective instructional leader and improve school quality.

Meeting the Demand for Upper Primary Education

About 34 million students are now enrolled in upper primary school or the equivalent (NCERT 1995). As more and more children complete primary school, demand for upper primary places will grow. Between 1986 and 1993 growth in the number of students and schools was already more rapid at the upper primary level than at the primary level (NCERT 1995). Responding to the increase in demand without a similar increase in resources could hurt the quality of schooling, as recent evidence from Tamil Nadu shows (see box 10.2).

Conclusions

Providing all children with a primary school education of higher quality is within India's grasp. Many states have identified and applied successful strategies for providing schools, classrooms, teachers, textbooks, and other instructional materials to reach this objective—strategies that could be adapted and used in other states. And many states have found avenues for cooperation between public and private institutions in training teachers, constructing and

BOX 10.2 THE QUALITY-QUANTITY TRADEOFF IN TAMIL NADU

During the past two decades the Tamil Nadu government has adopted many measures to increase enrollment: establishing a primary school in every village with more than 1,000 inhabitants, providing free midday meals 365 days a year to every child in primary and middle school, and providing free uniforms and books to every child in the midday meal program. Some measures specifically encourage girls' schooling: providing "marriage grants" to those who complete eighth grade, giving cash awards to headmasters who enroll and retain a high share of girls from scheduled castes and scheduled tribes, hiring large proportions of female teachers, and—since 1991—stipulating that only women can be hired as new teachers in primary schools.

The results? Between 1977 and 1972 gross enrollment rates increased from 93 to 101 percent at the primary level, from 57 to 96 percent at the middle level, and from 33 to 47 at the secondary level (Duraisamy and others 1996). But the quality of schooling fell. Student-teacher ratios increased, from 35:1 to 48:1 at the middle school level (grades 6–8) and from 25:1 to 42:1 at the secondary level. And grade 10 examination pass rates fell. Regression analyses show that every additional student in the class held back the growth in passes by 1.2 percentage points. The study concludes that if the student-teacher ratio had remained at the 1977 level, passes on the grade 10 examination would have been 16–20 percentage points higher.

managing schools, and producing and distributing textbooks—learning lessons that could be applied in other states.

Drawing on this experience, this chapter has estimated the costs of providing better schooling for all primary-school-age children. It shows that, with conservative assumptions about economic growth and expenditures, 80 percent of the resources required for universal primary education would be available if past trends continued.

But three problems must be resolved before universal primary education can be reached. First, states need to focus on systematic strategies for improving quality and learn more from one another. Already, many lessons of experience are being shared through the DPEP. This learning needs to be expanded and supplemented by rigorous research on the costs and effectiveness of different interventions tried at the state level. Preliminary work by the NCERT assessing the impact of state-level interventions could be expanded (Saxena, Singh, and Gupta 1995).

Second, a means for transferring resources to the states with the highest share of children out of school needs to be found. All states have districts and parts of districts with acute educational deficiencies—areas that the DPEP is designed to assist. But in six of the largest states—Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal—the problem is statewide. These six states would need more than half of the additional resources required for all of India and spending growth double the rate attained in the past. Although opportunities to increase revenues and alter expenditure patterns in these states could provide most of the funding required, additional central resources will also be needed. Both industrial and developing federal countries have used a variety of mechanisms for general- and specific-purpose transfers from central to state governments for strengthening education. These mechanisms could be assessed and appropriate ones applied in India.

Third, strategies for increasing the demand for primary education need to be explored, to ensure that the places created in primary schooling are used. India has already gone far in building an awareness of the importance of education and helping families meet the direct and indirect costs of schooling. But more will be needed in the short run to realize the full benefits of better education for all.

APPENDIX A

School Incentive Programs

According to the results of the unit-cost study presented in appendix B, the school incentive programs administered in all states account for about 5 percent of total expenditure on elementary education—equivalent to more than twice the combined expenditure on furniture, educational materials (including Operation Blackboard), minor renovations, school stationery, and activities related to inspection and in-service training. Despite their importance, little evidence exists on the efficiency of the programs or their effectiveness in improving enrollment and retention rates. Previous assessments have focused only on the midday meal program in Tamil Nadu. The results are inconclusive. To increase the knowledge base, two case studies were commissioned (Sharma, Ramakrishnan, and Seth 1995a, 1995b). These studies covered the communities surrounding 15 schools in three districts in Haryana and three districts in Maharashtra.

The study involved teachers, community groups, parents of children in school who were receiving or not receiving incentives, and parents of children who were not in school. To elicit responses to what are complicated issues, various methodological tools were used. In addition to standard questionnaires, a substantial number of focus groups were held, and several participatory rapid appraisal techniques were used.

Haryana

The incentive schemes operating in Haryana cover textbooks, uniforms, stationery, incentives, and scholarships. The free textbook program distributes a set of three books and covers children from scheduled castes and other backward castes. Unstitched material for school uniforms is distributed to girls from scheduled castes. All children from scheduled castes qualify for a stationery allowance of Rs10 a year, and girls from scheduled castes are paid an attendance allowance. In the districts of Hissar and Sirsa the allowance is Rs10 a month for girls who attend at least 75 percent of school days, while in Jind it is Rs25 a month.

Coverage and Targeting

Extensive village mapping exercises indicated that the proportion of pupils receiving at least one incentive in the three districts was 18, 15, and 9 percent, respectively, although school records indicated proportions of 46, 42, and 35 percent, respectively. According to the records, the state government was providing free stationery for 28 percent of the 2,378 students enrolled across the three districts, free textbooks for 18 percent, attendance allowances for 18 percent, and free uniforms for 12 percent. Apparently, either schools were receiving goods and payments but not distributing them or parents did not like to admit that they were receiving incentive benefits. Teachers disagreed about which groups were the anticipated beneficiaries of each program, implying that official criteria are not strictly followed.

Of 399 parents interviewed, 59 were receiving some amount of attendance allowance or scholarship (scholarships were given in only 2 of the 15 schools). The annual amounts varied from Rs10 to Rs500, with a mean of Rs97; 78 percent received less than Rs100. Only 15 parents stated that they received free material for uniforms. Allegations were made that the incentives do not reach the intended beneficiaries and that they are not always distributed in the correct quantities. For instance, several parents stated that they received less attendance allowance than indicated on the receipts on which they gave a thumb impression. Enrollment registers are reportedly tampered with to inflate the number of pupils from scheduled castes and other backward castes.

The delivery system appears to be weak in a number of ways. In some cases teachers take apart the free textbook sets and share them among a greater number of pupils. In other cases they do not distribute them at all because of the excess number of claimants. Only a quarter of teachers stated that uniforms, stationery, and textbooks are made available on time, and less than half said that attendance allowances are paid regularly. Targeting is often ad hoc. There is a strong likelihood that some schools are invoicing for more than they need and distributing less than they receive.

Effectiveness

The observed inaccuracy of the raw school enrollment records precluded useful examination of enrollment trends. According to the investigators enrollment and attendance rates are invariably inflated. Another approach was to use the 1992–93 records as a base and, through extensive questioning of teachers, pupils, and community groups, to follow the cohorts of three class groups through to 1994–95. Differences between schools were very strong. No enrollment patterns emerged. Dropout rates ranged from 0 to 29 percent for pupils receiving incentives and from 10 to 44 percent for pupils not receiving incentives. In just under half the schools the difference in dropout rates between the two groups was 10 percent or more. Overall, over the three-year period the percentage of pupils receiving incentives who dropped out of school was 17 percent and, among the group not receiving incentives, 20 percent. These results suggest that the retention effects of incentive schemes are small.

An additional approach was taken to judge the effectiveness of incentives. Teachers and parents of children in school and not in school were interviewed, and focus groups were convened. Teachers' views varied: 50 percent believed that incentives have a definite and positive effect on enrollment, while 50 percent believed that they do not; 48 percent believed that they increase attendance, while 52 percent believe that they do not. The highest positive rates were for the attendance allowance (62 percent for enrollment and 57 percent for attendance). Ranking the effectiveness of schemes, teachers gave highest priority to textbooks and stationery. In general, parents also gave highest priority to textbooks and stationery but gave lowest priority to attendance allowances. Asked whether they would continue to send their children to school if incentives were withdrawn, 90 percent of those receiving the allowance said that they would. For all three groups of parents—those with children in school receiving incentives, those with children in school not receiving incentives, and those with children not in school—by far the major reason cited for problems of enrollment and dropout were poor-quality teachers (45 percent, compared with the absence of incentive programs, 5 percent). Discussions with 29 focus groups (conducted separately for males and females) were also held. One exercise attempted to elicit the nature of tradeoffs between incentives and other methods to encourage higher enrollment and retention.

In each case the alternative offered to an incentive program received a majority vote (see table A.1). However, because the groups included parents who did not benefit from incentives, the overall results are not too surprising.

APPENDIX TABLE A.1 ASSESSMENT OF TRADEOFFS, BY GENDER OF PARENT FOCUS GROUPS, HARYANA AND MAHARASHTRA
(percent)

	Share of groups in favor of alternative	
Alternative	*Male*	*Female*
Shared and better use of textbooks (rather than free textbooks)	82.0	83.3
More blackboards and charts (rather than free stationery)	72.5	74.0
Additional regular teachers (rather than an attendance allowance)	91.0	78.3
Better building and space (rather than free uniforms)	76.0	61.0
Extra time and attention to slow learners (rather than free meals)	92.0	66.0

Source: Sharma, Ramakrishnan, and Seth 1995a.

The relative response rates, though, are interesting. Better use of free textbooks by schools is obviously desired, and additional classroom materials would apparently be favored over free stationery. Both of these are possible. Hiring additional regular teachers—using the savings realized by spending less on incentives—would be more difficult to achieve. Although both the male and female groups favored the alternatives to free uniforms and school meals, mothers were significantly less enthusiastic than fathers. Overall, the results indicate that better teaching practices, followed by motivated teachers in well-equipped schools, are more important than incentives in influencing enrollment and dropout decisions.

Maharashtra

The incentive schemes available in Maharashtra also cover textbooks, uniforms, stationery, and attendance allowances. In one of the three districts surveyed, milk is also available for all pupils in selected schools. Sets of free textbooks are made available to pupils from scheduled castes, scheduled tribes, and other backward castes. Uniforms are distributed to selected students from scheduled castes, scheduled tribes, and other backward castes. All students are eligible for free stationery. An attendance allowance is paid to families of backward caste girls whose families are below the poverty line. The allowance is Re1 a day for girls attending more than 75 percent of school days a month.

Coverage and Targeting

According to school records, 41 percent of children receive free textbooks, 22 percent receive stationery, 33 percent receive uniforms, and 12 percent receive an attendance allowance. There are considerable differences between districts and between schools within the same district. For instance, in one district all the children in one school receive textbooks, compared with only 10 percent in another district. Small schools appear to be better served than larger schools. Again, as in Haryana, although to a lesser extent, parents indicated a lower coverage of incentive schemes than the school records implied. According to village mapping exercises, parents estimated that the proportion of children who receive at least one incentive is 44, 29, and 68 percent, respectively, for each of the three districts, whereas school records estimate 67, 45, and 75 percent. The discrepancies are larger than can be accounted for by parents' reluctance to disclose receipt of incentives. Again, there were complaints that thumb impressions are collected on receipts that show higher incentive allowances than are actually paid. The attendance allowance is meant for girls of economically weaker scheduled castes and tribes. In some instances, however, girls from other castes are included, and the below-poverty-line criterion is said to be applied sometimes in an ad hoc way. In 7 of the 15 villages the view was that incentives are not reaching the deserving or the needy. In general, parents did not understand which groups receive incentives, and teachers perceived that the students most in need do not receive the incentives. Both groups favored more emphasis on economic criteria rather than on caste criteria.

The general opinion was that the quality of the materials in the incentive programs is reasonable but that both the quantity and the timeliness of delivery are not. More than 70 percent of teachers stated that uniforms, textbooks, and attendance allowances are not available on time or are irregular. There were substantial differences in the teachers' comments across schools.

The incentive program appears to have both strengths and weaknesses. A third to half of pupils are covered by the textbook, uniform, and stationery schemes, and the materials supplied are of reasonable quality. However, the schemes are erratic, have several leakage points, and do not always ensure that the most needy are included. Both teachers and parents stress the need to shift the criteria for inclusion away from caste and toward economic status.

Effectiveness

School record data, together with village mapping exercises, showed no relationship between incentive programs and enrollment growth or dropout rates between schools. According to parents, the quality of the teachers is a determining factor. A second approach followed the behavior of grade 1 and 2 pupils in 1992–93 over the following three years. Two conclusions emerged. First, in 7 of the 15 schools the dropout rate was zero, while in 4 schools it was more than 30 percent. Second, of the eight schools in which dropout rates were positive, rates were higher for students not receiving incentives in three schools and higher for students receiving incentives in five. Overall, the dropout rates were 16 percent among those who had received incentives and 17 percent among the rest. Much higher dropout rates were observed in one of the districts than in the other two. In that district, rates were much higher among students receiving incentives. At the least, it can be concluded that incentives do not bring the dropout rates of students at risk below the overall average.

Teachers, however, do believe that incentives are effective. Between a third and half of teachers argued that the incentives have a marginally positive effect. Only 5 of 28 teachers argued that they are ineffective. The most effective incentives were seen to be uniforms and attendance allowances. About 60 percent of teachers argued that the programs have an overall positive effect on attendance. In an exercise simply ranking the effectiveness of incentives for improving enrollment and retention, teachers suggested somewhat contradictorily that textbooks and uniforms are the most effective, with attendance allowances given low priority. Parents concurred.

Finally, community groups assessed the tradeoffs between various incentives and alternative methods of improving school outcomes (see table A.2). In four of the five cases the alternative was given a higher priority than the incentive. Unfortunately, not all alternatives would be easy to achieve. Furthermore, these responses were from groups representing the community, and they may be different than those of parents whose children receive the incentives. Overall, the implication is that disciplined teachers in adequate buildings with sufficient educational materials are the highest priority. This was further shown through an exercise to identify the elements of a good school. The items that were given highest priority were good teachers and free textbooks, followed by good buildings that include toilets.

Conclusions

The delivery of the incentive programs differs considerably between districts within the same states and between schools within districts. These differences cannot be fully explained by differences in caste composition. Both teachers and parents are uncertain about who is entitled to the incentives and who receives them. There appears to be some resentment that the eligibility criteria

APPENDIX TABLE A.2 ASSESSMENT OF TRADEOFFS, BY COMMUNITY GROUPS, HARYANA AND MAHARASHTRA
(percent)

Alternative	*Share of groups in favor of alternative*
Shared and better use of books (rather than free textbooks)	45.1
More blackboards and charts (rather than free stationery)	92.4
Extra time and attention given to slow learners (rather than free meals)	85.4
Additional regular teachers (rather than attendance allowance)	66.7
Proper building and space (rather than free uniforms)	65.9

Source: Sharma, Ramakrishnan, and Seth 1995b.

are based on caste rather than poverty. Distribution schedules are somewhat erratic.

The number of children who benefit from the schemes as recorded in school records differs considerably from the number as acknowledged by parents. In addition, there are accusations that school records inflate the number of children from scheduled castes and scheduled tribes to increase the receipt of scheme components. Attendance allowances, in particular, are perceived to be inadequately distributed. There is also evidence that schools do not receive all the supplies for which they qualify. One result is that textbook sets are divided up or, alternatively, are not distributed at all because the excess demand would lead to disharmony in the classroom.

Incentive schemes are not particularly effective in increasing enrollment and attendance and reducing dropout rates. School enrollment records are too unreliable to use and, in any case, show no clear patterns. Detailed follow-up studies over three years indicate that the dropout rates for students who receive incentives are at least as high as the rates for those who do not. Although the rates might be even higher in the absence of incentives, any impact appears to be muted. Far more important factors affecting enrollment and retention may be problems specific to the locality and school, such as the functioning of the village *panchayat* and the quality and commitment of the teachers. Teachers, however, did indicate that the withdrawal of incentives might adversely affect the children of poor families. When asked to rank the various schemes, teachers and parents agreed that textbooks, uniforms, stationery, and attendance allowances, in that order, are the most important.

The village mapping exercises gained information on 3,248 elementary-school-age children in Haryana and 1,320 in Maharashtra. Of these, 82 and 84 percent of children, respectively, were in school regularly. Reasons given for dropping out or for never enrolling included household work (63 children), financial cost (19), and wage employment (13) in Maharashtra and child's disinterest (85), household work (28), and parental apathy (28) in Haryana (financial cost was given as the reason in 23 cases). Therefore, direct and indirect cost was given as the reason for not attending school for 95 of the 1,320 children sampled in Maharashtra and for 51 of the 3,248 children in Haryana.

What level of incentive programs would be required to bring these children to school? To what extent are the existing programs likely to be the reason for current enrollments? The surveys shed little light on these important issues. In Maharashtra, of 320 children sampled, 23 were employed for wages (another 35 percent spent more than two hours a day on household work). Twenty of these did not attend school, and the mean number of days worked per month was 10. The mean wage was Rs128 a week. In Haryana the attendance allowance was Rs10 a month, and in Maharashtra it could reach Rs22 a month. While the earnings figures are not the result of a large, well-constructed survey, they suggest that the impact of the attendance allowance at its current level is likely to be very marginal and that a large increase would be required to have any pronounced effect. Although any additional income is welcome to poor families, it is unlikely that the attendance allowances are increasing enrollment and retention. Of the incentives that do appear to have an effect and that might be strengthened, the textbook scheme appears to be the most favored by teachers, parents, and the community. Before any attendance allowance schemes are withdrawn, however, a further study focusing only on parents receiving the allowance should be undertaken.

APPENDIX B

Unit Costs in Elementary Education

This appendix presents the results of two detailed case studies of unit costs across schools in six districts of Haryana and Maharashtra.

Fifteen schools in three districts in Haryana and three in Maharashtra were surveyed in detail between November 1994 and January 1995. The reference year was academic year 1993–94. Costs were divided into three categories:

- *Capital costs.* Land, building, major renovations, furniture, Operation Blackboard supplies, other educational and sports supplies, and electricity and water installation

- *Recurring material costs.* School incentives, minor renovation, and electricity and water charges

- *Recurring nonmaterial costs.* School-level salaries, inspection costs, in-service training, and annual functions.

Costs incurred regularly but not annually (for example, textbooks) were annualized. Costs of one-time items (for example, Operation Blackboard materials) were also annualized on the basis of assumed length of life.

Prior to a discussion of the overall results, some of the variations by item between schools in different districts within the same state and between schools in different states are presented:

- *Furniture.* The unit cost of furniture ranged from Rs2.2 to Rs6.1 in Haryana and from Rs3.9 to Rs5.2 in Maharashtra.

- *Operation Blackboard.* The unit cost was between Rs1.8 and Rs3.1 in Haryana. In Maharashtra expenditures were significantly higher, ranging between Rs8.6 and Rs16.8.

- *Building and renovations.* Omitting one district with particularly high building costs, the annualized unit cost ranged between Rs8.0 and Rs23.7.

- *Incentive programs.* Unit costs of the components of the incentive programs are presented per beneficiary and per enrolled student (see table B.1). The per beneficiary cost of uniforms was around Rs76 in Haryana and Rs42 in Maharashtra. Stationery costs averaged Rs10 in Haryana and Rs9 in Maharashtra. Apart from one district in which the per beneficiary cost of free books was estimated to be Rs72, the unit cost of this program tended to be about Rs16. There are surprisingly significant variations between districts within the same state, as well as between the two states, in the amount of scholarships and attendance allowances. In Haryana scholarships in two districts were Rs750 and Rs500—these were received by 29 students in the two schools. In Maharashtra they were Rs366 and Rs300 and were received by an unspecified number of students and handicapped students. Average district attendance allowances in Haryana were between Rs53 and Rs168, while in Maharashtra they were between Rs113 and Rs165. There were also reported variations between schools in the same district. For instance, in one district of Haryana 64 students

APPENDIX TABLE B.1 COMBINED COSTS PER STUDENT OF INCENTIVE PROGRAMS ACROSS DISTRICTS, HARYANA AND MAHARASHTRA, 1993–94
(rupees)

Program	*Haryana*	*Maharashtra*
Uniforms	10.5	11.4
Stationery	3.5	1.3
Textbooks	5.7	6.1
Scholarships	18.8	9.4
Attendance allowances	14.1	18.5
Total	52.6	46.7

Source: Sharma, Ramakrishnan, and Seth 1995c, 1995d.

each received Rs15 in one school, while 36 students each received Rs86 in another. In the Parhbani district in Maharashtra there is an additional program: school milk. The cost was a huge Rs173.9 per student.

Staff salaries are the largest component of unit cost. In Maharashtra they ranged between Rs931 and Rs1,142. In Haryana two districts had costs of Rs1,043 and Rs1,254, compared with just Rs527 in the third district. The explanation given is that in the third district the schools sampled tended to be young and to have fewer teachers. While the unit cost of staff was quite similar in five of the six districts, there were enormous differences between schools in teacher-student ratios and thus in the cost per student. In Haryana, the student-teacher ratios ranged from 14:1 to 114:1. The teacher cost per student ranged between Rs250 and Rs3,003. Costs were more than Rs1,000 in 5 of the 15 schools and less than Rs500 in 4 schools. In Maharashtra the range in the student-teacher ratio was narrower—between 17:1 and 93:1—but half the schools had ratios less than 30:1 or more than 50:1. Finally, the data allowed calculation of the average annual cost per teacher in each school in Haryana and Maharashtra. The range was very wide, from Rs13,442 to Rs64,416. However, in 11 of the 15 schools teacher costs were between Rs42,000 and Rs52,000. The lower costs were in the more recently established schools.

Unit costs ranged from Rs618 to Rs1,364 (see table B.2). In Haryana the average was Rs1037 and in Maharashtra, Rs1,139. Subtracting the average unit capital cost of Rs37 in Haryana and Rs51 in Maharashtra, the unit recurrent costs were Rs1,000 and Rs1,088. The distribution of these costs among major items is described in table B.3.

On average, salaries accounted for 93 percent of total recurrent costs, while incentive schemes took almost 5 percent. Just over 2 percent was spent on all other items for the upkeep and operation of the schools. The share for salaries was the same in the two states. The share for incentives was higher in Haryana

APPENDIX TABLE B.2 OVERALL UNIT COSTS OF ELEMENTARY SCHOOLING IN SIX DISTRICTS, HARYANA AND MAHARASHTRA, 1993–94

(rupees)

	Haryana			*Maharashtra*		
Type of cost	*Sirsa*	*Hissar*	*Jind*	*Aurangabad*	*Nanded*	*Parbhani*
Total	618	1,364	1,130	1,074	1,221	1,123
Recurrent	581	1,327	1,093	1,023	1,170	1,072

Source: Sharma, Ramakrishnan, and Seth 1995c, 1995d.

APPENDIX TABLE B.3 DISTRIBUTION OF UNIT RECURRENT COSTS OF ELEMENTARY EDUCATION IN SIX DISTRICTS, BY MAJOR ITEM, HARYANA AND MAHARASHTRA, 1993–94
(percent)

	Haryana			*Maharashtra*			
Item	*Sirsa*	*Hissar*	*Jind*	*Aurangabad*	*Nanded*	*Parbhani*	*Average*
Staff salary	90.6	92.8	95.8	90.8	95.0	93.4	93.0
Incentives	7.7	6.3	2.5	5.1	2.6	4.3	4.8
Operation Blackboard	0.5	0.1	0.3	1.6	0.7	0.6	0.6
Other[a]	1.2	0.8	1.4	2.5	1.7	1.7	1.6

[a] Includes furniture, educational materials other than Operation Blackboard, electricity or water bills, minor renovations, stationery, inspection, and costs related to in-service training.

Source: Sharma, Ramakrishnan, and Seth 1995c, 1995d.

(5.5 percent) than in Maharashtra (4.0 percent) while that for nonsalary school inputs was lower (1.4 and 2.9 percent).

The estimated unit recurrent costs of Rs1,000 for Haryana and Rs1,088 for Maharashtra for 1993–94 compare with the crude estimates of Rs764 and Rs1,176 based on 1991–92 figures (table 9.6) and allowing for annual increases similar to those in the previous six years. The figures for Maharashtra were reasonably similar. In Haryana, in addition to several of the incentive payments deriving from departments other than education, the enrollment figures used in the aggregate calculations may be overestimates. It is of interest that the aggregate unit costs for Haryana were the lowest of those calculated across six states. Whatever the cause of the disparity, it is believed that the case study estimates are more accurate. Roughly averaging between the estimates for Haryana and Maharashtra (Rs1,000 and Rs1,088), the recurrent unit cost for elementary education in 1993–94 was Rs1,050.

APPENDIX C

APPENDIX TABLE C.1 BASIC SOCIAL INDICATORS, 15 MAJOR INDIAN STATES, 1991–93

State	*Population, 1991 (millions)*	*Area (square kilometers)*	*Total fertility rate, 1992–93*[a]	*Crude birth rate, 1992–93*[b]	*Infant mortality rate, 1992–93*[c]	*Couples using contraception 1992–93 (percent)*	*Sex ratio, 1991*	*Life expectancy 1991 (years)*		*Literacy rate, 1991 (percent)*	
								Male	*Female*	*Female*	*Total*
Andhra Pradesh	66.51	275,068	2.6	24.2	70.4	—	97	59.0	61.5	34	33
Assam	22.41	78,438	3.5	30.4	88.7	—	—	54.2	54.1	—	—
Bihar	86.37	173,877	4.0	32.1	89.2	30	91	59.1	58.3	23	23
Gujarat	41.31	196,024	3.0	27.2	68.7	55	94	62.2	61.3	49	49
Haryana	16.46	44,212	4.0	32.9	73.3	50	87	—	63.6	41	40
Karnataka	44.98	191,791	2.9	25.9	65.4	48	96	68.8	74.4	44	44
Kerala	29.10	38,863	2.0	19.6	23.8	80	104	54.1	53.5	87	86
Madhya Pradesh	66.18	443,446	3.9	31.6	85.2	39	93	63.1	64.7	28	29
Maharashtra	78.94	307,690	2.9	26.3	50.5	53	94	55.9	54.8	51	52
Orissa	31.66	155,707	2.9	26.5	112.1	45	97	65.4	67.5	34	35
Punjab	20.28	50,362	2.9	25.0	53.7	69	89	57.6	57.8	50	50
Rajasthan	44.01	342,239	3.6	27.0	72.6	30	91	61.0	63.2	21	20
Tamil Nadu	55.86	130,058	2.5	23.5	67.7	56	97	56.8	54.6	52	51
Uttar Pradesh	139.11	294,411	4.8	35.0	99.9	28	88	60.5	62.0	26	25
West Bengal	68.01	88,752	2.9	25.5	75.3	55	91	59.0	69.4	47	47
All India	846.30	3,287,259	3.4	28.7	78.5	41	93	57.7	58.1	39	39

— Not available.

a. Live births per thousand women, ages 15–49.

b. Live births per thousand population.

c. Deaths per thousand live births.

Source: IIPS 1995; Nanda 1992.

APPENDIX TABLE C.2 BASIC EDUCATION INDICATORS, 15 MAJOR INDIAN STATES, 1993

State	*Primary schools*	*Teachers in primary schools*	*Teachers in primary sections, 1987*	*Children enrolled in primary school*	*Children ages 6–10 "in school" (percent)*	*Children ages 11–14 "in school" (percent)*	*Gross enrollment rate (percent)*	*Dropout rate (percent)*		*Discontinuation rate (percent)*[a]
								Male	*Female*	
Andhra Pradesh	49,247	107	14	7,040	67	58	89	42	42	9.9
Assam	28,876	70	7	2,930	72	68	96	—	—	3.3
Bihar	53,029	111	20	8,550	50	54	71	62	66	3.2
Gujarat	14,228	31	37	5,350	77	74	110	42	51	7.3
Haryana	5,659	17	14	1,810	82	80	83	2	7	4.2
Karnataka	23,600	45	54	6,040	76	63	111	37	44	7.9
Kerala	6,702	51	11	2,930	93	94	103	0	0	1.7
Madhya Pradesh	68,949	180	17	8,210	56	60	96	23	35	8.0
Maharashtra	40,142	134	78	10,580	85	77	111	24	32	7.1
Orissa	41,604	90	10	3,990	72	66	109	53	52	7.6
Punjab	12,486	45	0	1,930	84	77	81	21	23	5.4
Rajasthan	32,878	90	14	4,940	59	59	83	35	56	4.2
Tamil Nadu	30,229	116	14	8,020	90	73	137	16	18	10.9
Uttar Pradesh	79,522	300	7	13,010	61	61	69	20	20	4.2
West Bengal	51,021	160	0	8,030	73	73	98	36	46	6.2
All India	572,923	1,661	323	97,740	69.5	65.1	92	35	39	6.0

— Not available.

a. Percentage of ever-enrolled children who discontinued studies at anytime in the age bracket 6–14.

Source: India, Ministry of Human Resource Development, 1994b; NCERT 1992b, 1995; IIPS 1995; World Bank staff estimates; NCAER 1995.

APPENDIX TABLE C.3 BASIC ECONOMIC INDICATORS AND EDUCATION EXPENDITURE, 17 MAJOR INDIAN STATES, VARIOUS YEARS

	Education expenditure as a percentage of total government expenditure				*Education expenditure as a percentage of state domestic product*				*State domestic product (billions of rupees),*
State	*1980*	*1985*	*1990*	*1994*	*1980*	*1985*	*1990*	*1994*	*1992—93*
Andhra Pradesh	19.5	19.1	18.0	21.0	3.1	4.0	3.3	3.4	397
Assam	26.7	22.6	22.9	24.6	3.5	4.2	5.1	5.8	117
Bihar	22.8	24.4	24.5	20.1	3.2	4.1	5.3	4.5	293
Gujarat	19.1	23.9	21.8	20.8	2.6	3.9	3.7	3.4	322
Haryana	17.8	17.7	16.4	16.1	2.4	2.6	2.6	2.6	163
Himachel Pradesh	23.3	19.9	18.7	21.2	6.1	6.0	7.5	7.0	—
Jammu and Kashmir	15.4	15.1	14.8	11.3	4.0	4.7	4.9	4.1	33
Karnataka	18.9	17.7	19.7	21.4	3.0	3.6	3.8	4.0	291
Kerala	31.6	28.4	27.0	26.2	5.5	6.3	6.3	6.7	169
Madhya Pradesh	16.2	17.5	18.4	18.2	2.4	3.1	3.3	3.5	323
Maharashtra	20.1	17.8	19.5	17.8	2.6	3.0	3.0	3.1	754
Orissa	9.6	16.8	20.2	19.8	3.3	2.8	4.0	5.4	129
Punjab	25.0	20.1	19.8	17.2	3.1	2.8	3.0	2.9	224
Rajasthan	23.3	22.0	22.9	20.9	—	4.3	4.5	4.9	233
Tamil Nadu	20.4	21.5	22.4	21.3	3.3	3.8	4.9	4.4	352
Uttar Pradesh	20.2	20.8	21.8	18:8	2.5	3.1	4.3	3.7	612
West Bengal	21.8	23.6	26.4	26.9	2.8	3.4	4.3	3.6	416
All 15 states	20.6	20.6	21.1	20.4	—	—	—	—	4,872
All India	9.3	11.1	11.7	11.5	2.8	3.2	3.7	3.5	6,615

— Not available.

Source: India, Ministry of Human Resource Development, 1995a.

TABLE C.4 ESTIMATES AND PROJECTIONS OF SIZE OF AGE GROUP 6–10, BY GENDER, 15 MAJOR STATES AND ALL INDIA, SELECTED YEARS, 1990–2010

(thousands)

State	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1995*[a]	*2000*	*2005*	*2010*
All India[b]										
Males	54,158	54,602	54,957	55,193	55,311	55,312	54,229	54,835	56,530	55,217
Females	49,509	49,914	50,271	50,558	50,775	50,923	50,535	52,897	54,798	53,443
Total	103,667	104,516	105,228	105,751	106,086	106,235	104,763	107,732	111,328	108,660
15 major states										
Males	52,002	52,408	52,759	53,010	53,169	53,228	50,328	52,845	54,461	53,210
Females	47,312	47,749	48,145	48,464	48,713	48,885	47,492	50,897	52,807	51,533
Total	99,314	100,157	100,904	101,474	101,882	102,113	97,820	103,642	107,147	104,603
Andhra Pradesh										
Males	4,068	4,085	4,074	4,032	3,959	3,856	4,089	3,652	3,540	3,293
Females	3,921	3,954	3,957	3,926	3,861	3,763	3,902	3,550	3,435	3,191
Total	7,989	8,039	8,031	7,958	7,820	7,619	7,990	7,203	6,975	6,483
Assam										
Males	1,567	1,595	1,602	1,584	1,543	1,478	1,496	1,424	1,523	1,412
Females	1,440	1,464	1,474	1,468	1,448	1,413	1,425	1,401	1,476	1,368
Total	3,007	3,059	3,076	3,052	2,991	2,891	2,921	2,824	2,999	2,780
Bihar										
Males	6,044	6,105	6,190	6,295	6,422	6,568	6,250	6,626	6,811	6,900
Females	5,445	5,532	5,628	5,729	5,835	5,946	5,720	6,318	6,598	6,677
Total	11,489	11,637	11,818	12,024	12,257	12,514	11,969	12,943	13,409	13,577

Gujarat										
Males	2,556	2,552	2,540	2,518	2,486	2,444	2,621	2,553	2,680	2,392
Females	2,337	2,345	2,345	2,334	2,315	2,286	2,457	2,468	2,593	2,311
Total	4,893	4,897	4,885	4,852	4,801	4,730	5,078	5,021	5,273	4,703
Haryana										
Males	1,097	1,118	1,141	1,165	1,191	1,217	1,173	1,199	1,176	1,093
Females	963	983	1,003	1,020	1,037	1,052	1,049	1,132	1,140	1,059
Total	2,060	2,101	2,144	2,185	2,228	2,269	2,223	2,332	2,316	2,152
Karnataka										
Males	2,836	2,841	2,835	2,818	2,789	2,749	2,642	2,641	2,629	2,438
Females	2,647	2,646	2,640	2,627	2,609	2,585	2,485	2,563	2,550	2,363
Total	5,483	5,487	5,475	5,445	5,398	5,334	5,127	5,205	5,178	4,801
Kerala										
Males	1,513	1,498	1,486	1,475	1,466	1,459	1,488	1,335	1,273	1,308
Females	1,412	1,388	1,371	1,363	1,363	1,371	1,455	1,291	1,220	1,252
Total	2,925	2,886	2,857	2,838	2,829	2,830	2,943	2,526	2,373	2,419
Madhya Pradesh										
Males	4,354	4,407	4,455	4,492	4,520	4,538	4,572	4,784	5,192	5,060
Females	3,957	3,983	4,022	4,073	4,133	4,203	4,230	4,667	5,054	4,918
Total	8,311	8,390	8,477	8,565	8,653	8,741	8,801	9,451	10,247	9,978
Maharashtra										
Males	4,820	4,867	4,915	4,964	5,013	5,061	4,007	4,736	4,383	4,059
Females	4,404	4,468	4,530	4,587	4,640	4,688	4,504	4,548	4,241	3,924
Total	9,224	9,335	9,445	9,551	9,653	9,749	9,311	9,284	8,623	7,983
Orissa										
Males	1,864	1,867	1,874	1,882	1,891	1,902	1,906	1,830	1,820	1,719
Females	1,783	1,790	1,795	1,796	1,793	1,786	2,047	1,757	1,771	1,674
Total	3,647	3,657	3,669	3,678	3,684	3,688	4,033	3,587	3,591	3,393

(Table continues on the following page.)

TABLE C.4 *(continued)*

State	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1995*[a]	*2000*	*2005*	*2010*
Punjab										
Males	1,296	1,304	1,304	1,295	1,277	1,250	1,197	1,206	1,198	1,030
Females	1,111	1,110	1,106	1,099	1,088	1,073	1,092	1,154	1,159	996
Total	2,407	2,414	2,410	2,394	2,365	2,323	2,289	2,361	2,357	2,026
Rajasthan										
Males	3,066	3,086	3,097	3,095	3,080	3,054	3,119	3,235	3,529	3,331
Females	2,777	2,814	2,832	2,828	2,802	2,756	2,003	3,087	3,427	3,231
Total	5,843	5,900	5,929	5,923	5,882	5,810	6,002	6,322	6,956	6,562
Tamil Nadu										
Males	3,104	3,089	3,064	3,029	2,985	2,930	2,004	2,665	2,710	2,800
Females	2,886	2,866	2,847	2,827	2,808	2,787	2,661	2,600	2,620	2,703
Total	5,990	5,955	5,911	5,856	5,793	5,717	5,465	5,265	5,330	5,503
Uttar Pradesh										
Males	9,767	9,882	10,016	10,157	10,306	10,461	9,575	10,975	12,166	12,739
Females	8,350	8,474	8,620	8,782	8,959	9,150	8,519	10,527	11,814	12,353
Total	18,117	18,356	18,636	18,939	19,265	19,611	18,095	21,502	23,980	25,092
West Bengal										
Males	4,050	4,112	4,166	4,209	4,241	4,261	4,197	3,983	3,831	3,635
Females	3,879	3,932	3,975	4,005	4,022	4,026	3,943	3,833	3,708	3,514
Total	7,929	8,044	8,141	8,214	8,263	8,287	7,990	7,816	7,538	7,149

a. Government of India estimates.

b. All-India totals for 1987–89 are as follows:

	1987	*1988*	*1989*
Males	52,491	53,095	53,653
Females	47,857	48,509	49,047
Total	100,348	101,604	102,700

Source: World Bank staff estimates based on the 1991 census and a smoothed age-sex distribution based on the 1991 and 1992 Sample Reporting Survey and the 1993 NFHS.

APPENDIX TABLE C.5 ESTIMATES AND PROJECTIONS OF SIZE OF AGE GROUP 11–13, BY GENDER, 15 MAJOR STATES AND ALL INDIA, SELECTED YEARS, 1990–2010

(thousands)

State	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1995*[a]	*2000*	*2005*	*2010*
All India[b]										
Males	30,904	31,290	31,661	32,006	32,317	32,579	31,042	32,969	33,083	33,727
Females	28,105	28,582	28,963	29,271	29,534	29,771	28,902	30,464	32,143	32,716
Total	59,009	59,872	60,624	61,276	61,851	62,350	59,944	63,433	65,226	66,443
15 major states										
Males	29,734	30,096	30,414	30,707	30,991	31,236	29,667	31,630	31,716	32,350
Females	26,898	27,272	27,599	27,898	28,186	28,446	27,607	29,116	30,779	31,367
Total	56,633	57,367	58,012	58,604	59,177	59,682	57,273	60,745	62,496	63,719
Andhra Pradesh										
Males	2,296	2,333	2,372	2,409	2,435	2,446	2,249	2,224	2,225	2,028
Females	2,185	2,220	2,265	2,311	2,350	2,370	2,159	2,172	2,162	1,968
Total	4,482	4,553	4,637	4,720	4,785	4,816	4,408	4,395	4,387	3,995
Assam										
Males	805	837	874	910	940	958	829	834	892	893
Females	763	787	813	839	862	876	789	814	867	866
Total	1,569	1,624	1,687	1,749	1,802	1,835	1,619	1,649	1,759	1,759
Bihar										
Males	3,484	3,527	3,550	3,566	3,590	3,626	3,442	3,991	3,902	4,113
Females	3,041	3,097	3,144	3,189	3,236	3,288	3,163	3,594	3,779	3,982
Total	6,525	6,624	6,694	6,755	6,826	6,914	6,604	7,585	7,681	8,096
Gujarat										
Males	1,496	1,508	1,516	1,523	1,527	1,525	1,516	1,426	1,587	1,546
Females	1,339	1,358	1,374	1,388	1,398	1,402	1,422	1,342	1,540	1,498
Total	2,835	2,866	2,890	2,911	2,925	2,927	2,939	2,768	3,127	3,044

(Table continues on the following page.)

TABLE C.5 *(continued)*

State	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1995*[a]	*2000*	*2005*	*2010*
Haryana										
Males	619	624	632	642	654	666	647	740	706	692
Females	530	540	551	563	575	587	575	635	686	671
Total	1,149	1,164	1,183	1,205	1,229	1,253	1,222	1,374	1,391	1,364
Karnataka										
Males	1,633	1,655	1,673	1,687	1,695	1,698	1,533	1,608	1,595	1,540
Females	1,553	1,565	1,574	1,579	1,581	1,580	1,447	1,521	1,548	1,494
Total	3,186	3,220	3,247	3,266	3,276	3,278	2,979	3,129	3,143	3,034
Kerala										
Males	935	932	924	915	905	896	912	867	732	750
Females	910	900	883	863	843	828	889	826	703	719
Total	1,845	1,832	1,808	1,778	1,749	1,724	1,801	1,693	1,436	1,468
Madhya Pradesh										
Males	2,452	2,486	2,522	2,557	2,590	2,622	2,556	2,696	2,936	3,083
Females	2,286	2,318	2,333	2,339	2,345	2,359	2,363	2,532	2,857	2,999
Total	4,738	4,805	4,855	4,895	4,935	4,981	4,919	5,228	5,793	6,081
Maharashtra										
Males	2,742	2,787	2,820	2,847	2,874	2,902	2,740	3,042	2,750	2,574
Females	2,471	2,511	2,550	2,589	2,629	2,668	2,560	2,820	2,666	2,492
Total	5,213	5,297	5,369	5,436	5,504	5,570	5,300	5,862	5,416	5,065
Orissa										
Males	1,103	1,107	1,108	1,106	1,106	1,107	1,099	1,132	1,082	1,077
Females	1,045	1,046	1,049	1,054	1,058	1,062	1,144	1,051	1,054	1,048
Total	2,148	2,153	2,157	2,160	2,164	2,170	2,243	2,183	2,136	2,127

Punjab										
Males	730	742	755	767	777	782	717	727	739	685
Females	641	652	659	663	665	665	650	630	716	663
Total	1,371	1,394	1,414	1,430	1,442	1,447	1,367	1,357	1,455	1,348
Rajasthan										
Males	1,737	1,763	1,787	1,808	1,827	1,839	1,786	1,791	2,009	2,069
Females	1,508	1,546	1,586	1,625	1,658	1,681	1,646	1,602	1,952	2,009
Total	3,245	3,309	3,373	3,433	3,485	3,520	3,432	3,393	3,960	4,078
Tamil Nadu										
Males	1,842	1,853	1,859	1,859	1,856	1,847	1,814	1,710	1,577	1,662
Females	1,749	1,751	1,745	1,734	1,723	1,711	1,723	1,649	1,528	1,607
Total	3,591	3,604	3,603	3,593	3,578	3,557	3,537	3,359	3,104	3,269
Uttar Pradesh										
Males	5,577	5,639	5,687	5,736	5,797	5,866	5,387	6,296	6,653	7,355
Females	4,692	4,772	4,831	4,883	4,945	5,018	4,768	5,532	6,461	7,135
Total	10,269	10,410	10,518	10,619	10,741	10,884	10,155	11,828	13,115	14,490
West Bengal										
Males	2,283	2,303	2,335	2,375	2,418	2,456	2,440	2,547	2,332	2,285
Females	2,185	2,209	2,242	2,279	2,318	2,351	2,309	2,398	2,261	2,214
Total	4,467	4,512	4,577	4,654	4,736	4,806	4,748	4,944	4,593	4,499

a. Government of India estimates.

b. All-India totals for 1987–89 are as follows:

	1987	*1988*	*1989*
Males	29,620	30,085	30,506
Females	26,175	26,859	27,529
Total	55,795	56,944	58,035

Source: World Bank staff estimates based on the 1991 census and a smoothed age-sex distribution based on the 1991 and 1992 Sample Reporting Survey and the 1993 NFHS.

APPENDIX TABLE C.6 ENTRY-LEVEL SALARIES OF TEACHERS AND OTHER GOVERNMENT EMPLOYEES WITH COMPARABLE EDUCATION, INDIA, JULY 1994

(rupees per month)

State	*Primary teacher*	*Constable*	*Lower-division clerk*	*Head constable*	*Upper-division clerk*	*Pharmacist*	*Revenue inspector*	*Junior engineer*	*Trained nurse*
Central	1,200	825	950	975	1,200	1,350	1,400	1,400	1,400
Andhra Pradesh	1,010	810	910	1,010	1,100	1,010	910	1,330	1,150
Arunachal Pradesh	950	825	950	975	1,200	1,350	—	1,400	1,400
Assam	1,185	975	1,065	1,065	1,475	1,185	1,065	1,375	1,255
Bihar	950	950	1,200	975	1,200	1,320	1,600	1,500	1,200
Goa	1,200	825	950	950	1,200	1,200	1,400	1,400	1,400
Gujarat	1,200	825	950	1,320	1,200	1,400	1,200	1,400	1,640
Haryana	1,200	1,000	950	1,200	1,400	1,400	—	1,640	1,400
Himachal Pradesh	1,200	950	950	1,200	1,200	1,410	1,410	1,800	1,500
Jammu and Kashmir	950	950	950	1,340	1,200	1,400	—	1,760	1,200
Karnataka	1,040	960	960	1,040	1,280	1,280	1,190	1,400	1,400
Kerala	845	825	825	905	950	905	1,050	825	1,000
Madhya Pradesh	1,200	950	750	1,150	1,150	1,200	1,200	1,400	1,200

Maharashtra	1,200	825	950	975	1,200	1,350	1,400	1,400	1,640
Manipur	1,200	825	950	975	1,200	1,350	1,200	1,400	1,320
Meghalaya	1,200	975	1,050	1,050	1,375	1,200	—	1,375	1,375
Mizoram	1,200	825	1,200	1,200	1,400	1,400	1,640	1,640	1,640
Nagaland	450	400	535	450	720	600	—	690	600
Orissa	1,080	950	950	975	1,200	1,200	950	1,400	975
Punjab	1,200	950	950	1,200	1,200	1,410	950	1,800	1,500
Rajasthan	1,200	825	950	950	1,200	—	1,400	1,400	1,400
Sikkim	1,030	975	975	1,030	1,080	1,200	1,410	1,410	1,080
Tamil Nadu	1,200	825	975	1,200	1,200	1,350	1,200	1,640	1,400
Tripura	978	850	970	1,020	1,250	2,00	1,450	2,000	970
Uttar Pradesh	1,100	950	950	975	1,200	1,350	—	1,400	1,400
West Bengal	1,040	920	1,040	980	1,260	1,200	1,260	1,390	875

— Not available.

Note: Basic pay on 1 July 1994. Dearness allowance up to 116 percent with fixed annual increment on minimum of scale.

Source: India, Ministry of Human Resource Development, 1994b.

APPENDIX TABLE C.7 VALUE OF TEXTBOOKS AS A PERCENTAGE OF STATE EXPENDITURE, 12 MAJOR STATES AND ALL INDIA, 1992–93

(millions of rupees, unless otherwise noted)

State	*Total expenditure on education, 1992–93*	*Education expenditure as a percentage of total state budget*	*Value of textbooks*			*Value of textbooks as a percentage of education expenditure*[a]
			Grades 1–5	*Grades 6–8*	*Grades 1–8*	
Andhra Pradesh	13,949.8	19.56	74	67	141	1.01
Assam	6,458.0	24.69	126	44	170	2.63
Bihar	13,718.9	21.21	70	52	122	0.89
Haryana	4,063.5	15.89	36	33	69	1.70
Karnataka	11,805.5	20.79	117	136	253	2.14
Kerala	9,641.7	26.20	111	93	204	2.12
Madhya Pradesh	10,920.3	17.77	146	58	204	1.87
Maharashtra	19,524.7	17.69	364	66	430	2.20
Orissa	6,305.4	19.41	77	58	135	2.14
Rajasthan	10,235.6	21.47	—	—	—	—
Tamil Nadu	14,722.0	20.29	154	161	315	2.14
Uttar Pradesh	20,629.2	18.09	252	154	406	1.97
All India	190,282.4	20.00	138.8[b]	83.8[b]	222.6[b]	1.89[b]

— Not available.

a. The overall retail cost of textbooks compared with states' total education expenditure. Because the majority of states finance textbooks only in part, if at all, these figures do not show the share of the states' education expenditure that is accounted for by textbooks.

b. Average for 11 states.

Source: Personal communication, P. Cohen, 1996.

APPENDIX TABLE C.8 ANNUALIZED COST OF CONSTRUCTION FOR PRIMARY SCHOOL ROOFS AND WALLS, INDIA

Estimated annualized cost per square plinth foot (rupees)	*Type of roof*	*Type of wall*
0.49 or less	Sandstone *tukries* over a framework of wood joists; burnt brick jack arches over precast slender concrete joists	
0.50 to 0.74	Reinforced concrete laid with a slight slope; reinforced brick slab with slight slope; asbestos sheet roofing on manufactured steel trusses; corrugated iron sheet roofing on manufactured steel trusses; mangalore tiles on supporting wood framework	
0.75 to 0.99	Asbestos sheet roofing on timber supporting structure; corrugated iron sheet roofing on timber supporting structure; locally made country tiles on supporting bamboo framework; local stone slate roofing tiles on wood framework; straw thatch or palmyra leaves	Burnt brick in mud mortar with lime or cement pointing on both sides; random rubble stone or stone masonry wall in mud mortar; random rubble stone or stone masonry wall in lime or cement mortar
1.0 or more		Brick stone piers and infill wall panels of stabilized or compressed soil bricks or blocks; stabilized soil or compressed soil bricks or blocks in mud plaster with mortar on both sides; split bamboo walling

Source: School of Planning and Architecture 1995.

Notes

Chapter One

1. In India schools are fully government, government-aided private, or fully private. Government and government-aided private schools are publicly financed. This book refers to government schools as public schools.

2. States: Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, and West Bengal; union territories: Andaman and Nicobar, Chandigarh, Delhi, and Pondicherry.

3. Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, and Tamil Nadu in 1994; Gujarat, Himachal Pradesh, and Orissa in 1996.

4. For these reasons, and to ensure that investments would be equitable (targeted) and fully in line with national policy, the government explicitly chose a single national program over the earlier state-by-state project approach.

5. This book uses the term 6–10 years to refer to children who have reached their sixth birthday but have not yet reached their eleventh birthday and the term 11–13 years to refer to children who have reached their eleventh birthday but have not reached their fourteenth.

Chapter 2

1. It is important to emphasize that the approaches used and the definitions of outcomes focused on in this chapter are very narrow.

2. The economies are Hong Kong, Indonesia, Japan, Republic of Korea, Malaysia, Singapore, Taiwan (China), and Thailand.

3. Publication of the 1991 census results will allow an updating of this essentially exploratory analysis.

4. The index comprised nine measures relating to the labor force, agricultural development, and physical infrastructure.

5. The threshold may vary across sectors, and within sectors over time, depending on the dominant level of technology.

6. These difference could also be due to broad differences in health conditions across states.

7. With knowledge of the relation between education and social outcomes much stronger than knowledge of the relation between education and economic outcomes, a comprehensive study of the labor market effects of education is urgently needed. Most of the existing data on labor market outcomes of education are based on surveys at least fifteen years old. Although these provide many insights, they need to be updated for a more complete understanding of India in the 1990s.

8. Even in a system with no fees and materials provided free of cost, the opportunity costs of attending schools are still borne privately.

Chapter Three

1. The actual number of children enrolled, the age cohort enrollment rates, and the reasons for nonenrollment and nonattendance are subject to debate. A detailed analysis of what has been achieved and what challenges lie ahead is hampered by the limited availability of reliable education statistics. Moreover, virtually all estimates in this chapter are tentative and need to be refined as the complete data from the Sixth All-India Education Survey become available.

2. In this chapter the term *efficiency* refers to the flow of students through the system. Repetition and dropout reduce flow efficiency, while automatic promotion increases flow efficiency. This use is not the same as economic efficiency, which refers to obtaining equal output with fewer resources or greater output with equal resources.

3. This survey was carried out in 1992–93 by the International Institute for Population Sciences. Although it was not aimed at collecting education data, the broad consistency of the NFHS data with other sources (such as the literacy data of the 1991 census) suggests that the data are reasonably correct.

4. The primary net enrollment rate is defined as the number of children 6–10 years of age enrolled in primary grades 1–5, expressed as a percentage of the population ages 6–10. The primary gross enrollment rate is defined as the number of children enrolled in primary grades 1–5 (regardless of age), expressed as a percentage of the population ages 6–10. No recent time trend data on net enrollment rates are available in India, and age-enrollment data from the Sixth All-India Education Survey are not yet available. Therefore, estimates of net enrollment rates for 1993 in this chapter are projected on the basis of growth in gross enrollment rates, which are available for 1993.

5. Sample Reporting Survey figures appear to underestimate the size of the age cohort 5–9, while the NFHS figures appear to overestimate it. Appendix C, table C.4, presents estimates for age cohort 6–10 for 1990–95, 2000, 2005, and 2010 that are smoothed to take into account these differences. For 1995 it also gives official estimates of the primary-school-age cohort from the government of India.

6. Enrollments for 1993 are calculated by multiplying 1986 enrollments by 1.137.

7. By comparison, under ideal conditions (for example, an elite private school in the United States), 80–90 percent of children in any primary grade will be the same age.

8. The 1991 census reported a female literacy rate of 23 percent for Bihar, 20 percent for Rajasthan, and 86 percent for Kerala.

9. In 1987, 350,000 of India's 529,000 primary schools had two or fewer rooms, and 321,000 teachers were assigned to schools of this size (NCERT 1992b, tables 83 and 126).

10. Rs3 per day for 200 days for the 32 million children ages 6–10 who are out of school.

11. Projection scenarios for major states have been completed and are available separately in Mehta 1995a.

12. In particular, age-grade data are not routinely collected. Thus the proportion of 6-year-old children entering grade 1 can only be estimated.

Chapter Four

1. The major sources of data in this chapter are Shukla and others 1994 and DPEP baseline studies in low-literacy districts.

2. In this study grade 2 competencies for Hindi included letter and word recognition, simple reading and writing, and simple spelling; competencies for mathematics included basic number skills for numbers from 1 to 100, adding and subtracting two-digit numbers, and simple multiplication.

3. The scores in this study are not expected to be normally distributed around a mean of 50 percent because the test is based on the curriculum taught during the previous year in school. For all India, the modal score in arithmetic was about 32 percent correct, and for paragraph reading comprehension, about 29 percent correct (Shukla and others 1994, p. 31).

4. Scores on the achievement tests were not adjusted for coverage of the school system. According to 1992–93 NFHS data, only 51 percent of children ages 6–14 in Bihar attend school, compared with 95 percent in Kerala. Thus the higher scores in Bihar may result from the greater "selectivity" of the schools in that state, or teachers in Bihar might have helped students.

5. The grade 5 tests were the same as those developed for the 1991 survey; reliability was 0.80 or better. The grade 4 tests were developed specially for the DPEP and were not subject to the same rigorous development procedures; reliability has not been reported, although S. Shukla (1995a, 1995b) has analyzed the tests for face validity. World Bank staff estimated Cronbach's alpha reliability for grade 4 tests as 0.80 or better.

6. Both full and reduced final models, which retain only variables meeting the inclusion criterion ($t > 1.0$), are presented in World Bank 1996.

7. The positive effects for 12 years of mathematics may reflect a general "science stream" effect; the only students who complete 12 years of mathematics are in the selective secondary science stream.

Chapter Five

1. The DPEP baseline survey does not include measures of household welfare. A socioeconomic status (SES) proxy variable was constructed from a combination of parental education and occupation; SES quartiles in this paragraph refer to quartiles based on this proxy measure.

2. The Constitution of India lists 18 languages as "dominant regional languages," of which 1 is tribal, and the census recognizes 96 languages, of which two-thirds are tribal.

3. In high-concentration schools 75 percent or more of students are scheduled caste or scheduled tribe children; in low-concentration schools less than 25 percent of students are scheduled caste or scheduled tribe students.

4. Scheduled tribe students are more likely to be enrolled in schools with a high concentration of scheduled tribe students: 60 percent of scheduled tribe students were enrolled in such schools in Assam and Tamil Nadu, 25 percent in Madhya Pradesh, 24 percent in Orissa, 20 percent in Kerala, and 12 percent in Maharashtra.

Chapter Seven

1. The National Advisory Committee, appointed by the Ministry of Human Resource Development, recently concluded that schools require too many texts, imposing a heavy burden on students and teachers alike. The committee's report, *Learning without Burden*, is cited in the text as Pal 1993.

2. This chapter does not address the topic of the overall instructional quality of primary textbooks. More research on instructional quality of textbooks in India—including the density of information, sequence and repetition, presentation styles, selection of topics and examples, the nature of exercises, the matching of available teaching time with the time required to use the textbook, and various adjustments to the realities of the learning environment—would be required in order to cover this topic adequately.

3. Because states publish textbooks in different page sizes, comparison of page numbers among states is difficult. But converting textbook page sizes to A5 equivalents allows comparisons to be made. A5 pages in India are 140 millimeters wide and 210 millimeters high (5 1/2" x 8 1/4"). A thousand A5 sheets of paper stock of 60 grams per square meter weigh about 1.8 kilograms.

Chapter Eight

1. The only schools managed by the central government are those for children of government of India employees who are in transferable jobs and magnet schools at the district level that provide high-quality education to children from rural areas.

2. May not add to 100 percent due to rounding.

3. Research on the management process of effective schools in India is very limited, with the exception of this research and a few studies of privately managed schools; more research in this area would be valuable.

Chapter Ten

1. Unit costs for Lok Jumbish nonformal education programs in 1995 ranged from Rs638 (expenditures) to Rs1,327 (budget request; Lok Jumbish Parishad 1996); unit costs for the centrally sponsored scheme for nonformal education were Rs1,682 in 1994–95 (India, Ministry of Human Resource Development, 1995a, 1995b; India, Tenth Finance Commission, 1996).

2. This figure does not include the annual cost of the midday meal program, which was budgeted at Rs14 billion for 1997.

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